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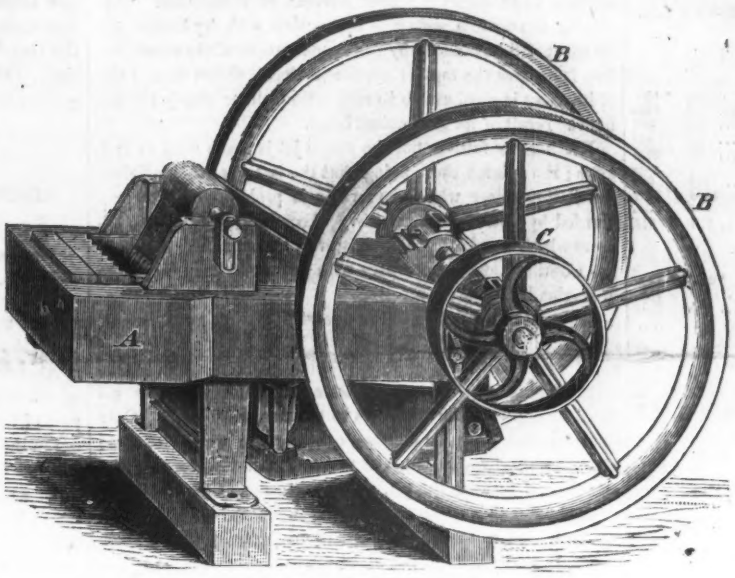
## BLAKE'S CRUSHER AND STONE BREAKER.

The machine shown by the annexed engraving is designed to break stones into small fragments for road-making, railroad ballasting, concrete or other purposes, and to crush any kind of ores or minerals. Figure 1 is a perspective view of the machine entire. The frame A, which receives and supports all the other parts, is cast in one piece, with feet to stand upon the floor or on timbers. These feet are provided with holes for bolts, by which it may be fastened down if desired; but this is unnecessary, as its own weight gives it all the stability it requires. B B are fly wheels on a shaft which has its bearings on the frame, and which, between these bearings, is formed into a short crank. C is a pulley on the same shaft, to receive a belt from a steam engine or other driver. Figure 2 shows a side view or elevation of the other parts of the machine in place, as they would be presented to view by removing one side of the frame. The parts of this figure which are shaded by diagonal lines, are sections of those parts of the frame which connect its two sides, and which are supposed to be cut asunder, in order to remove one side and present the other parts to view. The dotted circle D is a section of the fly-wheel shaft; and the circle E is a section of the crank. F is a pitman or connecting rod which connects the crank with the lever G. This lever has its fulcrum on the frame at H. A vertical piece, I, stands upon the lever, against the top of which piece the toggles J J have their bearings, forming an elbow or toggle-joint. K is the fixed jaw against which the stones are crushed. This is bedded in zinc against the end of the frame, and held back to its place by cheeks L that fit in recesses in the interior of the frame on each side. M is the movable jaw. This is supported by the round bar of iron N, which passes freely through it and forms the pivot upon which it vibrates. O is a spring of India rubber, which is compressed by the forward movement of the jaw and aids its return.




BLAKE'S STONE BREAKER—Fig. 1.

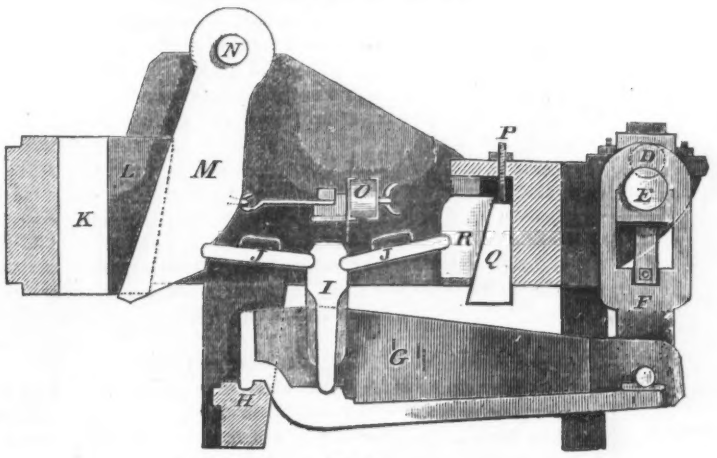



Fig. 2.

Every revolution of the crank causes the lower end of the movable jaw to advance toward the fixed jaw about ¼ of an inch and return. Hence, if a stone be dropped in between the convergent faces of the jaws, it will be broken by the next succeeding bite; the resulting fragments will then fall lower down and be broken again, and so on until they are made small enough to pass out at the bottom. The readiness with which the hardest stones yield at once to the influence of this gentle and quiet movement and melt down into small fragments, surprises and astonishes every one who witneses the operation of the machine.

It will be seen that the distance between the jaws at the bottom, limits the size of the fragments. This distance, and consequently the size of the fragments, may be regulated at pleasure. A variation to the extent of ½ of an inch may be made by turning the screw-nut P, which raises or lowers the wedge Q, and moves the toggle-block R forward or back. Further variations may be made by substituting for the toggles J J, or either of them, others that are longer or shorter; extra toggles of different lengths being furnished for this purpose.

These machines are manufactured by Blake Brothers, at New Haven, Conn., and also in England, under the superintendency of an especial agent. Several are in operation in the South American States, and a large number have been made in this country; sixteen corporations of Massachusetts are about to introduce them for road purposes. One may be seen in operation at the Central Park, where it has been in use since 1860. To all who desire a crusher for hard ores, we commend Blake's as a most effective machine.

## Meerschaum Works in Ruhla.

Bayard Taylor has been among the meerschaum factories, and gives the result of his observations to the *Tribune*. The great meerschaum headquarters is Ruhla in Germany. The following figures will indicate the amount of work going on there in the interest of smokers in all parts of the world. The annual product is: Mountings in brass German silver and pure silver, for pipe-bowls, 27,600,000; cases, chains, etc., for pipes, 19,000,000; pipe-stems, 15,000,000; pipes of all kinds, completely finished, 15,000,000; mouth-pieces and cigar-holders, 10,200,000; mounted porcelain pipe-bowls, 9,600,000; false meerschaum pipe-bowls, 5,400,000; pipe-bowls of wood, 4,800,000; pipe-bowls of clay and lava, 2,700,000; genuine meerschaum pipe-bowls, 540,000. It will be observed how small a part of the aggregate manufacture is genuine. Laborious colorers of clay should make a note of this. It affords a basis for estimating how many of the "splendid meerschaums" in which their owners find such proud satisfaction, are real and how many frandulent.

## Henry Wickenburg.

A correspondent of the Philadelphia *Press*, writing from Wickenburg, Arizona Territory, tells the following story:

"The sun had set seven hours before the trail which led along the Hassayampa ended in the mining town of Wickenburg. Yet, long before we reached it, we could see the glare from a distant cupola, and hear the regular stamp of the batteries in the distant quartz mill. Wickenburg is called after Henry Wickenburg, a kind, simple-hearted German, who discovered in 1864 the famous Vulture Mine, which is now being worked with such success. Mr. Wickenburg called to see us, and related, in a simple, unassuming way, the story of his great discovery. He came in with Bloomfield, in 1863, and and, with another companion, he left that gold-seeker in a few weeks. The two men spent long months hunting for gold through the mountains. Wickenburg's companion at length became sick and weary, and staid in camp while his companion prospected the hills. One hot day, Henry Wickenburg, thirsty and faint, sat down on a hill fifteen miles from the Hassayampa, the nearest water. His spirits were all but broken, and his money spent. He was attracted by the appearance of the rock, and on examining it he found his resting-place to be the cropping of a gold-bearing quartz lode unequalled in these mountains, famous for their mines. Wickenburg returned to his companion, who would not credit his story. At length they parted—the one to return with "Wickenburg's crazy story," Wickenburgh to remain minding his treasure. Here, far from white men, surrounded by hostile Indians, with only his wife to give him food, Henry Wickenburg remained alone for seven months, his faith increasing in his discovery. White men came at last, and found that Wickenburg was right. The mine was taken up, and a shrewd miner, Mr. Phelps, of New York, hearing of it, hurried out, and Henry Wickenburg sold his discovery-claim, one-third of which he owns, for $85,000.

Wickenburg, through sharpers and bad investments, has lost the greater part of this fortune, but he has enough in reserve. I can never henceforth look upon gold without at once being reminded of the story of this hardy Teuton, and the toil and sufferings of those who hunt for gold. The pearl on the neck of beauty is brought from the waves at the price of the diver's health.

## Improvement in Melting Iron Ore.

Messrs. Griswold & Co., proprietors of the Rensselaer Iron Works, Troy, New York, have tested, with favorable results, a new process for melting iron ore. The invention is known as Siemen's patent furnace, by which the process of melting is carried on in the heating furnaces by carbonic oxide gas, which is rendered combustible by contact with air, and passing over chambers is retained in the furnace without passing off at the chimneys or sending off the vast volumes of smoke which now blacken the atmosphere in the neighborhood of our iron establishments. Every particle of heat is exhausted in the furnace, and thus a great saving is effected in the process of manufacture. The gas furnace is placed outside of the building at a distance of about ninety feet, where the gas is generated, and then carried under ground by means of flues to the heating furnace. Here a stream of cold air is applied to the gas, combustion is produced, and the ore melted. The first application of the new process—new in this country, but extensively in use in England and France—was made in the mill recently, and worked to the satisfaction of all concerned. There is no doubt of its complete success. The furnace will cost upwards of fifteen thousand dollars.—*Journal of Applied Chemistry.*

## The Hoosac Tunnel

The Commissioners and Superintendent of the work on the Hoosac Tunnel have made their report to the Massachusetts Legislature. Some curious facts are revealed in this document. One of these is a statement to the effect that had a railway been laid for eight miles only up Deerfield River, to a vast lumber region at that point, the saving in cost of lumber and supplies thus made would have paid the whole cost of the road. The progress in boring last year with the Burleigh machine was highly satisfactory. With the aid of nitro-glycerine one hundred and fifty feet per month may be accomplished. The work on the central shaft, recently destroyed by fire, has not been resumed, and the Chief Engineer says "more trouble is anticipated from water at the west end. On the first of last November the heading had reached a total of 4,482 feet from the east opening, and 1,004 feet in the western shaft. On the whole, there is confidence in the future rapid progress of the tunnel, in spite of past obstacles and delays, and the Chief Engineer, who has been inspecting the Mount Cenis Tunnel, asserts that the machinery employed on the Hoosac is superior to that used in the European work.

## The Pacific Beach Mines.

So little in regard to these mines finds its way into print, that it is probable that many attentive readers are quite ignorant of their nature, extent, and origin, as well as of the means employed in gathering the gold. The following interesting account from the Philadelphia *Weekly Press* describing the California Coast mines, touches on all of these things, and will serve to familiarize the readers of the JOURNAL OF

MINING with the whole subject. The writer says: "This class of mines is confined to the north-western portion of California, extending into Southwestern Oregon. They are located as their name implies directly on the coast. Geologists account for their origin on the hypothesis that ancient rivers carried down these auriferous sands, and deposited them in the ocean. Afterwards, by some upheaval of nature, they were thrown up into elevated shores, or sometimes bold bluffs or promontories. These banke are now being reduced by the action of the waves, and the sand containing the gold particles is left on the beach by the receding tides. The prospecting is done after the ebb of the tide, and when a deposit is discovered the sand is gathered quickly by the ever-vigilant miners, and carried to high ground before the tide flows again. As a consequence these mines are ever shifting, and where a rich haul has been made at one time, in twelve hours there may be no appearance of gold. After the gold bearing sands have been gathered in this way, they are usually packed on mules and carried to sluices, where they undergo the usual washings for purposes of separation. This style of mining is profitable, but the misfortune has thus far been that these gold-bearing beaches have fallen into the hands of a few owners, usually companies, who own stretches of miles together, and thus prevent that individual enterprise so essential to mining success. The daily yield of some of these beach washings runs from $5 to $15 per hand. The wages paid are about $70 per month. Owing to the continual wearing of these gold ridges, and the never-ceasing deposits by the tidal waves, the supply of gold from beach mining may be set down as unceasing."

[Lest the reader may infer that beach mining on the Pacific coast is limited to the northwestern portion of California and Southwestern Oregon, we will state that localities on the British Columbia coast are made to yield handsome profits.—ED]

### Products of the Lake Superior Copper Mines.

We are indebted to the Portage Lake *Mining Gazette* for the following statements of the product of the Lake Superior copper mines. The tables are very complete, and are valuable for reference:

PRODUCT OF THE MINES FOR 1867.

PORTAGE LAKE DISTRICT.

| Mine. | Tons. | Lbs. | Mine. | Tons. | Lbs. |
|---|---|---|---|---|---|
| Pewabic mine | 1173 | 1432 | Albany and Boston mine. | 65 | 1724 |
| Quincy mine | 1119 | 1124 | Concord mine | 47 | 008 |
| Franklin mine | 962 | 1408 | Douglass mine | 46 | 468 |
| Calumet mine | 500 | 1484 | South Pewebic mine | 38 | 1625 |
| Huron mine | 562 | 1067 | | | |
| Isle Royal mine | 508 | 002 | Total | 6424 | 565 |
| Hancock mine | 350 | 439 | Product in 1866 | 5650 | 1747 |
| Hecla mine | 332 | 1138 | | | |
| Sheldon-Columbia mine | 315 | 1375 | Increase in 1867 | 773 | 818 |
| Grand Portago mine | 310 | 1269 | | | |

KEWEENAW DISTRICT.

| Mine. | Tons. | Lbs. | Mine. | Tons. | Lbs. |
|---|---|---|---|---|---|
| Copper Falls | 1086 | 1077 | Eagle River | 5 | 1501 |
| Pittsburgh & Boston | 908 | 1479 | Clark | 5 | 1303 |
| Central | 783 | 1714 | Mendota | 2 | .... |
| Pennsylvania | 311 | 877 | | | |
| Phoenix | 225 | 517 | | | |
| Bay State | 174 | 011 | Total | 3801 | 777 |
| St. Clair | 116 | 1055 | Product of 1867 | 3023 | 691 |
| Amygdaloid | 107 | 1620 | | | |
| Aetna | 58 | 1623 | Increase in 1867 | 778 | 086 |
| Madison | 15 | .... | | | |

OCTONAGON DISTRICT.

| Mine. | Tons. | Lbs. | Mine. | Tons. | Lbs. |
|---|---|---|---|---|---|
| Evergreen | 329 | 852 | Superior | 42 | 169 |
| National | 324 | 364 | Flint Steel River | 14 | 114 |
| Minesota | 287 | 807 | | | |
| Knowlton | 189 | 1267 | Total | 1509 | 1210 |
| Ridge | 128 | 1669 | Product of 1866 | 1701 | 1250 |
| Rockland | 84 | 1613 | | | |
| Oginia | 59 | 678 | Decrease of 1866 | 192 | 040 |
| Caledonia | 49 | 1697 | | | |

COMPARATIVE RECAPITULATION

| District. | Tons. | Lbs. |
|---|---|---|
| Portage Lage | 6424 | 505 |
| Keweenaw | 3801 | 777 |
| Ontonagon | 1509 | 1210 |
| Total | 11,735 | 552 |
| Product of 1866 | 10,375 | 1688 |
| Increase in 1867 | 1,359 | 864 |

PRODUCT OF THE LAKE SUPERIOR COPPER MINES FROM 1845 TO 1868.

| Year. | Tons. | Lbs. |
|---|---|---|
| 1845 to 1854 | 7,642 | .... |
| 1855 to 1857 | 11,312 | .... |
| 1858 | 3,500 | .... |
| 1859 | 4,200 | .... |
| 1860 | 6,000 | .... |
| 1861 | 7,400 | .... |
| 1862 | 9,062 | .... |
| 1863 | 8,548 | .... |
| 1864 | 8,472 | .... |
| 1865 | 10,790 | 1156 |
| 1866 | 10,375 | 1688 |
| 1867 | 11,735 | 552 |
| Total | 99,037 | 1369 |

### A New Meteoric Theory.

SIR JOHN HERSCHEL has recently advanced the theory, not wholly new, but never before supported by well-known facts, that meteoric showers are simply the light caused by the collision of the earth's atmosphere with the tenuous substance of a comet. Prof. Adams, who shared with Leverrier the credit of discovering the planet Neptune, not only accepts this theory, but attempts to establish the identity of the comet through which the earth recently passed, with Tailler's comet, whose orbit apparently coincides with that which, if a comet, the recent visitor would have taken. Those who have read Professor Tyndall's work on heat may find in this theory an additional reason to accept the learned writer's hypothesis as to the origin of the sun's light and heat.

### The New Brunswick Iron Interest.

The following is an extract from a letter written by a gentleman in Woodstock, N. B, we find published in the Canadian *Monetary Times*, of the 5th inst.: The Charcoal Iron Works, at Upper Woodstock, two miles from here, are not at present in operation, owing to difficulties among the parties interested in them; but as the fact of the manufacture of the iron being a profitable business has been satisfactorily established, we expect soon to see the two furnaces in "full blast." Negotiations, with the object of resuming work at an early day, are now, I hear, going on. The supply of ore is practically inexhaustible. The iron belt covers an extent of country from a half mile to six miles in width, and thirty or forty miles in length, at the least—probably much more.

## Original Papers.

[WRITTEN FOR THE AMERICAN JOURNAL OF MINING.]

### ON THE VENTILATION OF COAL MINES—V.

By J. W. HARDEN, C.E., Wilkesbarre, Penn.

Continued from Page 146.

The steam jet is the invention of GOLDSWORTHY GURNEY, of London, and was first introduced in 1816. In 1834 he recommended its application to the ventilation of mines. The ejection of high-pressure steam from a boiler, through a series of small apertures, at a high velocity into the upcast shaft, acting as a mechanical force on the air, drives the column before it, and, in so doing, causes the air to rush from around to fill the space exhausted. In a pit shaft, if this supply of air is easiest obtained from the sides and above, the steam-jet will not move the air below; but if the supply from these quarters is prevented, the air must be lifted from below; and thus the air through the pit to the downcast shaft will be set in motion.

Twenty years ago the comparative merits of the steam-jet and furnace were much contested by the engineers of the North of England, good results being obtained by both means. By some of its advocates the power of the jet, for all practical purposes, was said to be unlimited. In the facility by which the current can be set in motion and augmented, it has an advantage; but when the action of the jet is not incessant, and momentum becomes exhausted, ventilation ceases; whereas in furnace ventilation, on the fire being discontinued, the current is kept up at gradually decreasing velocity by the temperature remaining in the shaft. Where the seam is very fiery, the steam jet may be applied without the risk of an explosion, which the furnace involves. It may be applied either at the top or bottom of the shaft. In conjunction with the furnace, it is found to produce the largest amount of ventilation. Applied at the bottom, unless in connection with dry heated air, its effect will be reduced by the condensation of the steam, before it reaches the top. Experiments have shown that little of its effect is attributable to rarefaction, all, or nearly all, being the result of its mechanical force.

Neither the furnace nor the steam jet is much used in Belgium; the opinion there being that the latter is not a sufficient ventilating power while, the former is prohibited by law, unless fed by a stream of fresh air. According to English engineers who have visited them, however, the most fiery mines of the Continent do not compare with the moderately fiery ones of England.

In respect to situation in the upcast, for securing the greatest effect from the jet, practical men were for some time divided, some advocating the top and others the bottom. One of its advocates asserted that better ventilation would be secured by applying the steam jet to the downcast shaft. Only the other day, I saw an opinion, carrying the weight of some authority with it, that it might yet be found that forcing the air into and through the pit, would best prevent explosions.

How far such is likely to be the case, when dealing with an elastic fluid, I will leave my readers to judge. Our fathers were not so far wrong then after all, in their use of the old "Blow George" for driving air into the pit.

As the effective action of the jet is practically attributable to the velocity of the issuing steam, and not to its rarefaction, it is obvious that the lighter the column of air propelled, and, in consequence, the sooner it is dispersed in the open atmosphere, the better. A position admitting of the exhaustion of the steam at the top of the upcast, where its force becomes impaired, is the best.

Experiments made by Prof. FARADAY, some years ago, to ascertain the most effective size of orifice and pressure of steam, determined that the work done by the steam was measured by the water evaporated to form it, and that the effects from jets with orifices of different diameter, were nearly in a direct ratio with their sizes; but it was found also that more was done in proportion to the quantity of steam, as the jet was reduced.

In some well-conducted experiments on a large scale in the North of England, it was found that, with a pressure of 32 lbs. on the square inch, and orifices varying in diameter from an eighth to three-eighths of an inch, placed in a tube or box eighteen inches square, through which the air was drawn, effects varying from 2,056 to 6,534 cubic feet of air per minute were obtained.

A shaft of 22 feet area having been built for the purpose, and the quarter-inch jet selected; with 40 lbs. on the square inch pressure, the issuing steam preserved its conical form to a distance of four and a half feet, at which height it covered a sectional area of eighteen inches in diameter. On twelve jets, equally distributed over the area of the shaft, it was found that their cones overlapped each other at the same height, four and a half feet, forming a piston or moving stratum of steam, covering the area of the shaft. It was therefore concluded that a pressure of 40 lbs. to the inch on the boiler, and quarter-inch jets so placed that each cone of steam at their several points of contact should cover an area of 254 inches, would give the maximum effect.

Having ascertained the most suitable size of orifice, we may consider the power of the jet as depending on the pressure on the boiler by which the steam is supplied, and the comparative area of column on which it acts. The number of jets to be employed will depend on the evaporative power of the boiler. But as a given orifice with a given pressure of steam will only lift the air of a given sectional area, it follows that the area of shaft and amount of ventilation required by the pit to which it is applied, will determine the number of jets to be employed and the boiler-power required to supply them.

By placing the jets in cylinders covering the area of the shaft of a smaller size than the area covered by each cone of steam, if left unconfined, the power of the jets may be increased. In other words, with a given pressure of steam, a reduction of area in the columns acted on increases the velocity of the moving column below, so much as to counterbalance the decrease of area.

Mistakes are made by using steam of too low a pressure, and by not using a sufficient number of jets. I have known a single jet used, with room enough left round it in the shaft for the compressed air in the front to return and fill up the exhaustion behind. I have seen a single jet with a large orifice not accomplishing the object desired, removed, and a larger orifice, too large, in fact, for the evaporative power of the boiler, substituted; and, as one might expect, but to the surprise of the operator, no better effect was produced. The "steam jet" was therefore pronounced "of no use."

Although a powerful auxiliary to ventilation, the steam jet in deep mines will not be found equal in all respects to the furnace. There are, however, conditions in which it is probably the most efficient agent that can be applied. In shallow pits and slopes, it is of much service. It is equally effective whether applied horizontally or vertically. In mining ironstone through the shafts of exhausted coal pits (the goaves and broken ground of the old coal workings preventing the erection of a furnace), the writer has used it a good deal, but at considerable cost for protection from fire. In sinking deep shafts, nothing answers the purpose better. With some nine-inch air troughs and a pit of steam from the winding engine boiler, turned upward in the topmost trough, you will get all the ventilation needed; and it is very little in the way of the shaft. The practical engineer will see that in numerous emergencies the jet might be made of great service.

[TO BE CONTINUED.]

[WRITTEN FOR THE AMERICAN JOURNAL OF MINING.]

### MINING AND METALLURGY IN MEXICO—V.

A SKETCH OF THE SYSTEM OF WORKING MINES AND OF EXTRACTING THE PRECIOUS METALS FROM THEIR ORES, AS PRACTISED IN MEXICO. BY DAVID COGHLAN, MINING ENGINEER, SCRANTON, PA.

Continued from Page 131.

MR. LAUR has taken out a patent for a new system of treatment for this class of ores (called in Mexico *rebeldes*, literally, rebellious). He proposes to extract in this way the greater part of the silver. During his tour in Mexico, he explained to me the whole process; but as it is the subject of a patent I do not feel myself at liberty to describe it. I was about to make a practical trial of it on a large scale, when the Revolution which ultimately overthrew the Empire, prevented any further move in the matter. The waste of the silver which occurs in treating the sulphurets in pans without previous burning, and which is estimated at 35 per cent., seems to be so serious that no amount of expedition in concluding the operation can counterbalance such reckless loss; and no efforts should be spared to obviate so serious a leakage of the nation's resources. I know that the climate of many of the mining districts of this country is not well suited, in winter at least, to the patio system; but I think some modification of this, or substitution of another method, might be found to obtain the desired result. The Mexican system has been tried in Germany on floors, heated by hot air passed underneath to attain artificially the heat required; but I believe nothing practical came of it. This system of pans seems to be the one almost universally used in the Pacific States. The difference between it and the Mexican "Cazo" is principally, that the bottom of the former pan is cast iron, while the latter is copper; and again, *all* classes of ore for amalgamation, are treated in the former, while only chloride, bromide, and native silver are beneficiated in the latter. I have tried myself, from curiosity, to extract the silver from sulphurets in the "Cazo," but with scarcely perceptible effect; so I must attribute the partial success of the treatment in pans, to the desulphurizing effect of the iron dust worn off by the revolution of the mullers. Would not the addition of filings of wrought iron be more effectual? It is a considerably more efficient desulphurizer than cast iron.

I may mention before finishing this subject, that the silver ore of the Guanajuato district always contains a percentage of gold. This is partly separated during the grinding process in the "Arrastras," a very little mercury being spilled in, on commencing the operation. This soon unites with the free gold present, and from its weight sinks between the blocks of stone forming the bed, which are taken up at intervals, and the pure gold amalgam scraped out. A part, however, remains combined with the silver and is separated from it at the mint by solution of the silver in nitric acid, the gold remaining free. I may say in passing, that there are several errors in KUSTEL'S description of the patio process. He says: "Ores containing gold cannot be heated by patio;" again, "gold ores, and argentiferous lead ores are entirely excluded from this process;" both of which assertions are incorrect. With the exception of the gold amalgam, scraped from the arrastras, ALL the gold produced in Mexico is yielded by the patio; and silver ores

in which the proportion of lead is not very large are also treated by this method, though they are not so well suited to it as other classes. I doubt if the amalgamation can be made with more economy in pans than by the patio. I do not know what the actual average cost of the former is; but in Mexico, the ore being on the spot, and without making allowance for interest of money invested in apparatus or for cost of extraction from the mine, ordinary ore can be beneficiated at $12 a ton, and base-metal ore, requiring burning, at $20.

CAZO AMALGAMATION.

The grinding must be much coarser for this, than for the patio; "like sea-sand" is the best comparison I can make, though of course some of the softer parts of the substance are reduced to pulp in grinding. This, however, must be separated, both because it clogs the action of the mercury in the pans, and because it contains silver only in the state of the brittle sulphurets, which, not being suitable for the Cazo system, are treated in the "patio." The chloride and bromide are tough; the grains may be flattened between the teeth, which is a way of proving them should there be any doubt of their composition. This property prevents their being ground fine, like the sulphurets, and greatly facilitates their treatment. When the grinding is concluded, the mass is emptied into a small reservoir, and clean water let into it, while a man stands inside, stirring the mud with his feet and a shovel. The water is gradually let off from the top downwards. The sandy portion remains, while the mud runs off with the water into a large depression in the ground, where the water evaporates or sinks, leaving the mud to be treated by patio. If the ore is of a greater richness than 18 lbs. of silver to the ton, it is emptied directly from the arrastras into the pan; should the ore be poorer than this, it is submitted to a concentration process, not practised, to my knowledge, in other countries. A sloping heap of clay is enclosed within a rough timber framing and pounded down hard into a concave curved form; the chord of the curve forming about 15 degrees with the horizontal, the slope becoming steeper as it ascends. The sand is thrown across the top of the slope, and a man, sitting at the foot, dashes water, with a cow's-horn cut longitudinally through the centre, from a pool near him, on the metallic sand. This requires dexterity; but the separation of the metalic part from the lighter sand is quickly accomplished. The latter runs towards the foot of the slope arranging itself in the order of its specific gravity. After a short period, the lower parts are removed, up to, say, half the slope, and, being generally found to show no silver, they are thrown aside as useless. The sand remaining is again heaped up on the top of the slope, the same operation repeated, and the tailings separated. The third time, the ore is carried in a highly concentrated form to the pans for amalgamation. The ores of the poorest class are thus reduced to from one-seventh to one-ninth of their original weight, and may be concentrated even to half this. In this latter case great care is required. As no mundic or blende ever occurs in the *Colorados*, from which these minerals are derived, the residue contains only combinations of silver mixed with some gangue. This system of concentration is rapid and effectual; and, what is of great value in a country where water is scarce, very little water is required. This method is also used for treating the tailings of rich ores after treatment in the patio.

CATORCE is the district in which this system has been carried to the greatest perfection, owing to the great quantities of "*Colorado*" ores occurring there. Indeed, I may say it is almost unknown in other places. The pans used are composed of a cast copper bottom, about six inches thick, with sides rising about eight inches; all this is one solid casting, and is seven feet in diameter. This is placed in masonry over a small furnace. The sides, to a height of two feet above the copper, are formed of wooden staves slightly sloping outwards so that the diameter of the vessel is eight feet at top. In the interior, on the copper bottom, the same apparatus is arranged as I have before described, under the head of *Arrastra*; only instead of large stones, copper blocks, dragged round quickly by mule power, rub on the bottom, working on exactly the same principle as the Nevada pans, except that the latter are of iron. This system was invented in Peru some centuries ago, while the "patio" process was originated in Mexico.

The pan being half filled with water, is heated to boiling point, the ore (about a ton) is thrown in, and the mule started at a trot. Five per cent. of salt is added, then about one-quarter the quantity of quicksilver required. After half an hour a trial is made, and should the amalgam be observed in a granulated form, a new dose of quicksilver is added. After four or five hours, the amalgamation is concluded, a plug on a level with the bottom is opened, and the mud flows out, leaving the heavy amalgam in the bottom. The mud, on flowing out, passes through a trough in which are arranged at intervals cross pieces of board two or three inches high, to cause the settlement of any fine amalgam that may have passed out. The mud is collected in a reservoir, and added afterwards to the ore under treatment by the patio process, so that any sulphuret it may contain, will thus give up its silver, and the copper from the wear of the pan acts beneficially, as sulphate of copper would. The amalgam is extracted from the cazo after each operation, or after three or four, as may be thought proper. This is very injurious to the health of the men employed, as the vapors of the mercury are always present, from the high temperature required. The subsequent operations are similar to those employed upon the patio amalgam, except that the latter gives perfectly pure silver after burning, whereas the cazo silver has to be refined by melting with lead in a cupelling furnace, to carry off the small amount of copper mixed with it. The loss of quicksilver by this process is mechanical, and also partly due to a small amount vaporized, and does not generally exceed one-seventh the weight of silver extracted, whereas the patio consumes one and a-half times the weight of silver. For rapidity of production and economy, it is vastly superior to any other system in use; but unfortunately the oresadapted to it are comparatively scarce. It is sufficient proof of its excellence to say, that ores producing eleven oz. per ton in the cazo, and the fine mud of which, when separated as before described, and beneficiated in the patio, gives an equal quantity, or in all twenty-two oz. per ton, will pay for extraction from mine, carriage of twelve miles on mule-back, and treatment in metallurgical works. An artificial formation of chloride from the sulphurets of rebellious ores, has been lately practised to some extent, though not with entire satisfaction, for the following reason: The ores have to be roasted for nearly double the time required to roast for the patio; hence greater expense of fuel and labor, greater volatilization of silver, greater formation of arseniates and antimoniates, which may be considered lost; and this more than balances the slowness of the patio and its greater loss of quicksilver.

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[Specially furnished to the American Journal of Mining.]

## Review of the Iron and Steel Interests of the United States and Europe.

At a recent meeting of the American Iron and Steel Association, held at Philadelphia, the Secretary read as follows:

MR. PRESIDENT AND GENTLEMEN: In obedience to the requirements of the by-laws of the American Iron and Steel Association, your secretary begs leave to submit the following report of the transactions of your organization during the past year.

It will be remembered that prior to the adjournment of the last meeting, which was held in the city of Washington, on the 16th of January of last year, the following resolution was adopted: "Resolved--That when this meeting adjourns, it adjourns to meet in Cincinnati on the third Thursday of May next, at 10 A.M., unless the time and place be previously changed by the Executive Committee." On the 3d of April, the Committee met for the purpose of considering the expediency of holding the meeting at the time and place indicated in the resolution; and although after an exchange of views, the committee were unanimously of the opinion that under the circumstances then existing, it was advisable to postpone the meeting, yet it was deemed proper before taking final action upon the subject, to obtain so far as practicable within a limited time, the views of other members of the Association. For this purpose the Secretary was directed to communicate with a number of our members in various sections of the country, and representing different branches of the iron and steel interests. The views thus obtained were mainly in unison with those of the committee, so the postponement was decided upon, the members of the Association being informed of the decision through a notice published in the *Weekly Bulletin* on the first of May last. Your Secretary would state in this connection, that a very large majority of our members appears to be in favor of but one general meeting or convention during the year. The constitution of the Association makes provision, by implication, for an annual meeting for the election of a Board of Managers, empowering the latter to make such By-Laws, not inconsistent with the Constitution, as may be deemed necessary. Under this authority the Board of Managers, acting through its Executive Committee, has, in the past eighteen months, deviated from the practice (followed during the first year after the organization of the Association) of holding general quarterly meetings. The necessity for frequent general meetings, at stated periods, is lessened by the facilities which we possess for calling our members together at any time, for the consideration of such important measures as may require immediate attention and united action.

At the last meeting of the Association, your Secretary gave a brief but carefully prepared statement, showing the action of Congress upon the subject of the tariff up to that date. In order that all may understand the subsequent history of the bill and its present status, the following statement is submitted: It will be remembered that, a short time before the meeting above alluded to, the report of Hon. David A. Wells, Special Commissioner of the Revenue, was laid before Congress. The rates of duty recommended by Mr. Wells are lower—in some cases considerably lower—than those embodied in the bill that passed the House during the previous session, which were principally those agreed upon by the Association, upon the condition that all internal revenue taxes were to be removed. The classification of bar, rod, band, hoop, sheet and plate iron, that had been prepared by our Executive Committee with much care and labor, was so modified by Mr. Wells as to result in a general reduction of the rates recommended particularly in regard to the smaller sizes of those irons. On the 14th of January, 1867, the Senate Finance Committee, after a careful consideration of the House bill, as well as that submitted by Mr. Wells, reported back to the Senate a bill agreeing more nearly, both to classification and rates, with the House bill above alluded to. The bill passed the Senate on the 31st of January, 1867, with some modifications, the most important of which was a clause introduced by Senator Sherman, repealing the provision, justly placed in the law, authorizing the construction of a railroad and telegraph line from the Missouri River to the Pacific Ocean, requiring all roads receiving government aid to use American iron of the best quality. The Committee of Ways and Means of the House commenced the consideration of the bill, as amended by the Senate, on the 5th of February, and on the 18th of that month reported it back to the House, where it was made the special order of the day until disposed of. In regard to the rates of duty on iron, the committee generally concurred with the amendments of the Senate; the clause above mentioned relating to railroad iron, however, was stricken out. It may be proper to observe here that the influence of our organization was exerted to achieve this result. It is well known that the important privileges and pecuniary aid granted to the companies now engaged in building the Pacific railroads, were advocated by a large portion of our people, on account of the provision alluded to, requiring them to use American iron, which they deemed eminently just, patriotic and advantageous to our native industries. A repeal of this provision, now that the valuable franchises have been secured to the companies, would justly be regarded as a breach of good faith toward those who advocated the measure mainly on account of this clause of the act.

With the exception of the amendment just alluded to, the Senate bill was concurred in by the Committee of Ways and Means, so far as the item of iron was concerned; the rates on steel, however, were generally advanced, and very properly, as those embodied in the Senate bill were inadequate to protect that interest. The rates on many of the items classed as manufactures of iron and steel were also increased by the Committee.

The bill, as has previously been stated, was reported to the House on the 18th of February, and its consideration commenced on the 26th. On the 27th, that portion of the bill relating to iron and steel was reached, and the amendments of the Committee of Ways and Means were adopted. On the 28th it became evident that, in order to pass the bill, it would be necessary, owing to the limited time, (there being but three legislative days remaining,) to discharge the Committee of the Whole from the further consideration, in order that the House could proceed at once to vote upon, concurring with the amendment of the Senate, the amendments of the Committee of Ways and Means, so far as they had been adopted by the Committee of the Whole, to be included. A motion to this effect was made by Mr. Morrill, and decided in the negative by a vote of 108 yeas to 64 nays—two-thirds being necessary to suspend the rules. Upon the same day another effort was made, upon motion of Mr. Stevens, of Penn., to suspend the rules, with the same object in view, but it was also decided in the negative. Another effort, likewise upon the same day, was made by Mr. Morrill, to have the duties imposed by the present tariff increased to the extent of one-fifth, or twenty per cent., on all articles imported into the United States excepting railroad iron, which was also summarily defeated.

After this, no further attempt was made in Congress to pass a general tariff bill. The rates on wool and woolen goods, however, were increased by the passage of a bill specially relating to those interests, just before the adjournment of Congress.

Thus the passage of this important measure was again postponed. Although a number of causes contributed to this result, the chief of these was the great length of time consumed in its consideration in the Senate. This was, perhaps, unavoidable, as that body had before it both the bill passed by the House during the previous session, and that prepared by Special Commissioner Wells, which, owing to the time required to perfect its details, was not ready for presentation until the session was nearly half over. When the bill was finally passed by the Senate, it partook much more of the character of a new bill than of an amendment to the House bill, (as which, under the constitution, it was necessary to be considered). The consideration of the bill, in both Houses, was obstructed by dilatory motions and unnecessary interpolations by its enemies who, though greatly in the minority, succeeded in defeating it.

But although we have thus far failed in securing the passage of a tariff bill, we are too well aware of the necessity of such a measure, by the experience of the past two or three years, to slacken our exertions now. In the judgment of those who are familiar with the present condition of our producing interests, there never was a time when their very existence was so entirely at the mercy of a contingency as now. The premium on gold, uncertain and vacillating though it is, is the principal barrier that stands between the American handicraftsman and ruin. His patriotic sensibilities are wounded by the conviction that the process, by means of which the credit of his country is restored, leads to the destruction of his own maintenance. In asking for an increase of the tariff, we sincerely believe that we are making a request that, if granted, will lead to the employment of the many thousands of idle workmen who now swarm in our midst. There can be no excuse for delay. The bill is now before Congress, cleared of many of the features that, during the last two sessions, occasioned the protracted debates which led to its postponement. Indeed, it would appear that the objections which presented themselves during the previous discussion of the bill, were settled to the satisfaction of a decided majority in Congress before its adjournment last spring. We can see, therefore, no obstacle in the way of its passage at an early day, and hope and trust that our legislators may be induced to give the measure the prompt attention that its great importance demands.

STATISTICS.

Owing to the large number of iron works, of various kinds, in the United States, and the vast extent of country over which they are scattered, the task of collecting reliable statistical information is by no means a light one; for while the proprietors of most of the works report with commendable promptness, others do so only after frequent applications have been made. It is true that in some works, where a number of kinds or classes of iron is manufactured, no inconsiderable time is required to give an analysis of the production in accordance with the forms which we have adopted; but we are satisfied, if the importance of the work were fully understood, full and accurate returns from all would be transmitted without unnecessary delay. Since the beginning of the present year, your Secretary has sent blanks, for the purpose referred to, to the various iron works throughout the country, about 1,100 in number, and a very large proportion of them have been filled and returned. These have been arranged and tabulated, and the results obtained are herewith submitted. It is proper to remark that, with one or two exceptions, full reports have been received from the anthracite furnaces and rail mills, while with regard to the other furnaces, rolling mills and forges, a number of estimates were necessarily made, but with such care as to justify the belief that they will be but slightly modified by the correct returns to be hereafter received. The last meeting of the Association took place so early in 1867 as to preclude the possibility of giving, at that time, the production of our iron and steel works for the previous year (1866). These will be given in this report, in order that a comparison may be made with the corresponding figures for last year.

The following statement exhibits the quantity of anthracite iron manufactured in each State during the years 1866 and 1867 respectively, in tons of 2,000 lbs.:

| | 1866. | 1867. |
|---|---|---|
| Massachusetts | 3,606 | 3 500 |
| New York | 118.274 | 145,417 |
| New Jersey | 40.680 | 36,919 |
| Pennsylvania | 573.759 | 586.584 |
| Maryland | 13,048 | 12,363 |
| Total | 749,367 | 784,783 |

Anthracite iron was first made in this country about the year 1837, since when its production has increased to the volume indicated by the above figures. Its history has been marked by some severe reverses, the principal of which were caused by unwise legislation. The statistics of this branch of business were first compiled in 1849, showing the production for Pennsylvania only, which amounted, in that year, to 118,664 tons. The production of the whole country in

| | |
|---|---|
| 1854 was | 339,435 tons. |
| 1855 | 381,886 |
| 1856 | 443,113 |
| 1857 | 390,385 |
| 1858 | 361,430 |
| 1859 | 471,745 |
| 1860 | 519,211 |
| 1861 | 409,229 |
| 1862 | 470,315 |
| 1863 | 577,638 |
| 1864 | 684,018 |
| 1865 | 479,558 |
| 1866 | 749,367 |
| 1867 | 784,783 |

The production of raw coal and coke pig iron during the past two years has been as follows:

| | 1866. | 1867. |
|---|---|---|
| Pennsylvania | 170,600 | 191.072 |
| Ohio | 97,198 | 126,375 |
| West Virginia | 1,198 | 1,200 |
| Total | 268,996 | 318,647 |

The progress of this branch of manufacture has been steady, as the following figures, for the past fourteen years, indicate. The production in

| | |
|---|---|
| 1854 amounted to | 54,485 tons. |
| 1855 | 62.390 |
| 1856 | 69,554 |
| 1857 | 77,451 |
| 1858 | 58,351 |
| 1859 | 84,841 |
| 1860 | 122,228 |
| 1861 | 127,037 |
| 1862 | 130,687 |
| 1863 | 157,961 |
| 1864 | 209,626 |
| 1865 | 189,682 |
| 1866 | 268,996 |
| 1867 | 318,647 |

The average annual increase in the make of raw coal and coke pig iron in Pennsylvania du ing the above-named period, has been about 12,300 tons, and in Ohio, 8,200 tons. In the former State it has increased from 29,941 tons in 1854, to 191.072 tons in 1867; in the latter, from about 20,000 tons in 1854 to 126,375 tons in 1867.

The tabular statement following exhibits the quantity of charcoal pig iron made in the country during the past two years:

| | 1866. | 1867. |
|---|---|---|
| Vermont | 4,816 | 1,907 |
| Massachusetts | 14,514 | 12.262 |
| Connecticut | 19.671 | 18,607 |
| New York | 24.920 | 26,942 |
| New Jersey | 6.426 | 9,000 |
| Pennsylvania | 57,841 | 60,155 |
| Maryland | 26,652 | 24,000 |
| Ohio | 87,888 | 89,525 |
| Michigan | 35,448 | 55,743 |
| Missouri | 25.663 | 19,500 |
| Wisconsin | 5.241 | 5,400 |
| Kentucky | 15,000 | 21,300 |
| Other States | 8,500 | |
| Total | 332,780 | 344,341 |

In New England, the expansion of the charcoal pig iron manufacture, for a number of years, has been prevented by the scarcity of timber, and many furnaces, owing to this cause, have been abandoned. At the present rate of consumption, however, it is believed that there will be no exhaustion of the supply of wood, on account of the rapid advance of the "second growth." The production of charcoal iron in New York in 1867, as compared with that in 1854, exhibits a falling off of about 8,000 tons; the make steadily declined from 34,970 tons in 1854, to to 11,897 tons in 1861, since when it has as regularly advanced, amounting, in 1867, to 26,942 tons, as previously stated.

The beginning of the charcoal iron manufacture in Pennsylvania is dated as far back as the year 1715. Up to the end of 1776, seven furnaces had been erected. From that time to the beginning of the present century, twelve others were built. We learn, from the most reliable records, that fourteen furnaces made iron during the year 1800, and five were idle, though not abandoned. Within the next thirty years forty-nine additional charcoal furnaces were built and ten abandoned. From 1830 to 1847, one hundred and thirty furnaces were built (an average of eight per annum) and twenty-six abandoned. In the latter year, the number of charcoal furnaces in Pennsylvania reached its maximum, there being one hundred and seventy in working order. Since that time, with the exception of a single year, the number of furnaces annually abandoned, equal or largely exceed the number erected; during the years 1856-7-8 forty-eight were abandoned and dismantled. In 1854, the production was 116,000 tons. During the following eight years, the average annual decrease was over 9,000 tons; the whole make in 1862, by forty-six furnaces, being only 42,880 tons. Since then, as observable by the figures previously given, there has been an increase, averaging about 3,000 tons annually. But little charcoal pig is now made in Pennsylvania west of the mountains, the production last year, by the five furnaces, in blast, being about 6,500 tons.

In Ohio the fluctuation in the production of charcoal pig, owing to apparent causes, has not been so marked. Its manufacture there may be said to date from about the year 1830; from that time to the year 1857 it largely increased in volume, the production in the latter year being 81,156 tons. Since then, the average annual make has been 67,265 tons, falling to 51,390 tons in 1861, and rising to 89,525 tons in 1867.

In Michigan, the development of this branch of manufacture has been quite remarkable. The first furnace was erected in 1852. In 1854, the production was only 900 tons. Since that year the average annual increase has been 4,200 tons, the quantity made last year amounting to 55,743 tons.

The increase in Missouri has also been considerable. In 1854, the total production in that State was 5,298, three furnaces being in blast: in 1866, six furnaces produced 75,663 tons.

The following statement exhibits the total quantity of pig iron made in the United States during the years 1866 and 1867:

| | 1866. Tons. | 1867. Tons. |
|---|---|---|
| Anthracite pig iron | 749.367 | 784,783 |
| Raw bituminous coal and coke iron | 268,996 | 318.647 |
| Charcoal iron | 332.780 | 344,341 |
| | 1,351,143 | 1,447,771 |

The product of the forges and bloomaries in the country during the past two years is as follows:

| | 1866. Tons. | 1867. Tons. |
|---|---|---|
| Maine | 305 | 321 |
| New Hampshire | 1,314 | 1 500 |
| Vermont | 1.700 | 1,550 |
| Massachusetts | 4,644 | 4,471 |
| Connecticut | 736 | 620 |
| New York | 23,313 | 22,634 |
| New Jersey | 6,493 | 5,980 |
| Pennsylvania | 31.330 | 31,747 |
| Other States | 3.720 | 4,250 |
| Total | 73,555 | 73,073 |

As near as we are able to estimate, the proportion of the above, made direct from the ore, was, in 1866, 36,500 tons, and in 1867, 35,800 tons, making the grand total production of iron from the ore:

| | Tons. |
|---|---|
| In 1866 | 1,387,643 |
| In 1867 | 1,483.571 |

The total product of the rolling mills in 1866 and '67 was as follows:

| | Tons. |
|---|---|
| In 1866 | 1,026.189 |
| In 1867 | 1,041,946 |

Of these quantities, the proportion of rails is as follows:

| | 1866. Tons. | 1867. Tons. |
|---|---|---|
| Maine | 3,342 | 9,900 |
| Massachusetts | 29,457 | 27,189 |
| New York | 58,947 | 57,043 |
| New Jersey | 2,816 | 2,076 |
| Pennsylvania | 212,786 | 245,081 |
| Maryland | 2,532 | 10,840 |
| West Virginia | 989 | 800 |
| Ohio | 31,849 | 33.199 |
| Kentucky | 9,856 | 8,000 |
| Michigan | 11,186 | 8,062 |
| Indiana | 10,438 | 8.944 |
| Illinois | 45,534 | 44,896 |
| Tennessee | 11,046 | 5,390 |
| | 430,778 | 461,420 |

Of the product for 1866, 182.082 tons were new, and 248,696 tons re-rolled; for 1867, 207.552 tons were new and 253,868 tons were re-rolled.

It is impossible, as yet, to accurately analyze the other products of the rolling mills for 1867, as many of the returns gave the total quantities without specifying the items composieg them; but we have succeeded in itemizing the production in 1866 which we give, by States, in the following tabular statement, which may be relied upon as substantially correct:

| States. | Merch. Bar and Rod. | Sheet. | Plate | Hoop. | Nails and Spikes | Axles and Other. | Total. |
|---|---|---|---|---|---|---|---|
| Maine | 4.892 | .... | .... | .... | 350 | .... | 4.942 |
| New Hampshire | 1,167 | .... | .... | .... | .... | .... | 1,167 |
| Vermont | 200 | .... | .... | .... | 2,740 | 950 | 3,890 |
| Massachusetts | 16.564 | .... | 9,143 | 830 | 22.666 | 7,025 | 56,228 |
| Rhode Island | 6 591 | 1,700 | .... | .... | 4,200 | .... | 12,491 |
| Connecticut | 7.78 | .... | .... | .. | .... | 1,675 | 8,853 |
| New York | 47,657 | 600 | 239 | 425 | 7.170 | 14,106 | 70,197 |
| New Jersey | 11,478 | .... | 6,000 | 435 | 24.519 | 6,184 | 48.616 |
| Pennsylvania | 118.013 | 22,035 | 35,006 | 11,595 | 47,332 | 9,940 | 243 921 |
| Delaware | 2.717 | 283 | 1,064 | .... | .... | .... | 4.064 |
| Maryland | 5.569 | 3.261 | 10,566 | .... | 1,480 | 2,726 | 23.602 |
| West Virginia | 2,500 | 320 | .... | .... | 21.575 | .... | 24,395 |
| Ohio | 42,266 | 3,640 | 4.426 | 3,164 | 15,593 | 6,953 | 76,052 |
| Other States | 9,700 | 2,130 | 5,663 | .... | .... | .... | 16,993 |
| Total | 276,192 | 34,069 | 71,507 | 16.451 | 147,625 | 49.559 | 595,411 |

The following tabular statement exhibits the total quantity of iron of all kinds, consumed in domestic forges, rolling mills and foundries in 1866:

| | | |
|---|---|---|
| Domestic product of the ore as before enumerated | 1,387,643 | |
| Deduct quantity sold in bars immediately to consumers by bloomaries and therefore not entering into the manufactures embraced by this table | 12,000 | 1,375,643 |
| Scrap imported | | 15.000 |
| Scrap domestic | | 80,000 |
| Old rails | | 325,000 |
| Scotch Pig imported | | 80,000 |
| Total | | 1,875,643 |

Of this total, excepting Scotch pig therefrom, the following are the proportions of pig, scrap and old nails respectively consumed by domestic forges, rolling mills and founderies:—

| | | |
|---|---|---|
| Amount last stated | 1.875,643 | |
| Deduct Scotch pig | 80,000 | 1,795,643 |
| By forges, product | 37,055 | |
| Waste | 12,352 | 49,407 |
| By rolling mills, product | 1.026.189 | |
| Waste | 256,547 | |
| | 1,282,636 | |
| Deduct blooms* | 52,055 | 1.230,581 |
| By foundries, domestic pig, | | 515,655 1,795,643 |

The Scotch pig imported was consumed by the foundries, making with the domestic pig, a total for this class of works, of 595,655 tons.

The following is an approximate estimate of the consumption of domestic pig iron:

| | Tons. |
|---|---|
| Domestic pig consumed by forges | 35,000 |
| " " " " rolling mills | 800,488 |
| " " " " foundries | 515,655 |
| Total as previously dated | 1.351,143 tons. |

The following statement exhibits the quantity of iron of all kinds used in every form of domestic manufacture for general consumption:

| | | | |
|---|---|---|---|
| Total of domestic iron produced from ore as previously stated | | | Tons. 1.387,643 |
| Pig iron | imported | 80,000 Tons. | |
| Rolled and hammered | do. | 232,500 | |
| Scraps | do. | 15,000 | |
| Total imported | | | 327,500 |
| Add old rails, reworked, domestic | | 325,000 | |
| Scrap | do. | 80,000 | 405,000 |
| Grand total | | | 2.120,143 |

Of this total the quantity and kinds of rolled and hammered iron, obtained from all sources consumed in the U. S. in 1866, was:—

| | Domestic Pro'd Tons. | Imported Tons. | Total consumed Tons. |
|---|---|---|---|
| Rails | 430,778 | 100,000 | 530.778 |
| Merchl. bar and rod | 276.192 | 81,950 | 358,142 |
| Sheet | 34,069 | 17,715 | 51,784 |
| Plate | 71.587 | 960 | 72.467 |
| Hoop | 16,459 | 9,725 | 26,184 |
| Nails and spikes | 147.625 | | 147,625 |
| Axles and other | 49,559 | 22,150 | 93,209 |
| †Hammered bars and Shapes | 21,500 | | |
| | 1.047,689 | 232,500 | 1,280,189 |

* The total blooms produced from ore is: 36,500
Sold direct in bars 12,000
24,500
Total blooms by forges 37.055
Made into bars and shapes 9,500
The waste in making which is added under the head of forges in the text 27,555
Total blooms going into mills 52,055

† Produced as follows:—
By bloomaries, bars 12 000
" Forges 9,500
Total 21,500

Total amount of finished wrought iron that entered into general consumption in 1866.

The per centage, respectively of foreign and domestic iron of all kinds, which entered into general consumption in 1866, is:—

| | Domestic Tons. | Foreign Tons. | Total Tons. |
|---|---|---|---|
| Rolled and hammered as above | 1,047.689 | 232,500 | 1.280,189 |
| Pig Iron | 515,655 | 80,000 | 595,655 |
| | 1,563,344 | 312,500 | 1,875.844 |

Which gives the proportion of 83 per cent. domestic to 17 per cent. foreign.

Our information relative to the production of the steel works of the country for 1867 is not sufficiently full to enable us to state the exact amount. But the returns received indicate that the product varied but little from that of the previous year (1866,) which was as follows:—

| | |
|---|---|
| New England | 2,603 Tons. |
| New York, (not including Bessemer steel) | 1.000 " |
| New Jersey | 4 157 " |
| Pennsylvania | 11,213 " |
| Total | 18,973 " |

In 1867 about 3,000 net tons of Bessemer steel were made. The production of this material promises to be materially augmented during the present year. In addition to the works now in operation at Troy, Albany and Harrisburg, two others, one at Lewistown, Pa., another at Cleveland, Ohio, will soon commence operations.

The steel manufacture is suffering severely from the effects of foreign competition. The importation last year amounting to 21,566 tons (net) about 53 per cent. of the quantity consumed in the country. Our steel works as well as our iron works have ample facilities for supplying the home demand for their products, and it is without doubt the policy as well as the duty of the government to give them an opportunity to do so.

It is impossible to ascertain from our government records, the quantity of iron and steel imported into the country during the year 1867, as the treasury accounts are made up to the end of each *fiscal* year (June 30th.) But we find by the last report of the British Board of Trade, that during the year ending Nov. 30th, 1867, the following quantities of iron and steel were shipped from the various British ports to this country. The quantities are reduced to net tons.

| | |
|---|---|
| Pig | 143,684 |
| Bar, angle and rod | 50,751 |
| Railroad | 188,770 |
| Castings | 1,357 |
| Hoops, steel and plate | 35.056 |
| Old for remanufacture | 21,566 |
| Other iron (wrought) | 8.661 |
| Total iron | 449 845 |
| Steel | 21,556 |

These quantities exceed by 23 per cent. the importations of the previous year.

Of the whole quality of pig iron exported by Great Britain during the period above given, the United States took 22 per cent., a much larger quantity than was exported to any other country. Of bar, angle, bolt and rod, we took 15 per cent., British India alone proving a better customer. Of the 651,859 tons of railroad iron exported, 188,770 tons were shipped hither, or 29 per cent. Leaving out India, which is a part of British domain, we imported more English railroad iron than any other twelve of her customers. Of hoops, sheets and boiler plate, we imported 35.056 tons, being 25 per cent. of the total quantity of English Exports of this kind of iron. Of the 37,092 tons of steel exported by England, 21,566 tons, or 58 per cent., were shipped hither. Surely these are startling facts, and yet we are often told by British and American free-traders that this is the only country with which England has not free and unrestricted commercial intercourse

In 1867 the total quantity of iron ore received in the Lake Superior region amounted to 516,981 tons, an increase over that of the previous year of 55 per cent. The history of this branch of business in that district dates back to 1858. In that year 34,759 tons only were mined; since then it has increased to its present gigantic proportions. Within the past year several new mines have been opened, and the capacities of the old ones largely increased.

A brief review of the iron trade abroad during the past year, may not be out of place here. In England this branch of business has largely participated in the calamitous depression which the general trade of the country has experienced since the great monetary panic of 1866. Lower prices of iron of all kinds have ruled and are still ruling than have been known for very many years. The causes of the stagnation are attributed partly to over-production a few years ago; the collapse of home and foreign railway schemes for extensions and new lines, and to the defective harvests of last year. The full returns showing the production of iron in England during last year have not yet been received, but judging by the reports from several of the principal iron producing districts, it will be somewhat less than in 1866, when the product of pig iron reached 4,536,051. The quantity of iron exported from Great Britain in 1867 exceeded by about 200,000 that of the previous year.

In Scotland, although the iron trade suffered in common with other industries, the production of pig iron reached 1,031,000 tons, being an excess of 37,000 tons over that of the previous year. The shipments and home consumption amounted to 1,068,000 tons, a falling off, compared with the corresponding figures of 1866 of 68,000 tons. The stock on hand at the close of the year was 473,000 tons. The whole number of furnaces in Scotland is 164; of these 112 were blowing at the close of the year. The average number of furnaces in blast throughout last year was 108, and the production per furnace, 9,500 tons. The fluctuations in prices have been comparatively unimportant, varying from 51s. 6d. to 55s. 6d. per ton, mixed numbers, f. o b. at Glasgow averaging 53s. 6d. per ton. The present price is 52s. 6d. Miners' wages averaged during last year 4s. 9d. per day, being 3d. lower than the previous year, and we are informed that the tendency is still downwards. The home consumption of pig iron was as follows: By foundries, 264,000 tons; by rolling mills, 156,000 tons. Of the shipments, 255,000 tons were sent to domestic ports; of the latter, considerably more than one-third was shipped to the United States.

In France the production of pig iron in 1867, is estimated at 1,142,800 tons, as follows:

| | |
|---|---|
| Of charcoal pig | 177,300 tons. |
| Of coke pig | 886,000 tons. |
| Of charcoal and coke (mixed) | 78,700 tons. |

These figures show a decline in the production of pig iron as compared with the previous year of 110,300 tons. The product of manufactured or wrought iron amounted to 801,000 tons, a decline of about 10.000 tons.

In Belgium the iron trade during the past year has been in a somewhat depressed condition, particularly so in regard to pig iron, the exports of this iron being considerably less than in 1866. The home demand has also been less active. Another unfavorable element with which the Belgian blast-furnaces have had to contend with, has been a heavy increase in the importation of pig iron. The exports of rails show an augmentation of 14,000

tons. In the first ten months of 1866, Belgium exported to the United States 1,480 tons of rails, while during the same period last year not a single ton was shipped to this country.

From Prussia and Austria we have no late statistical information relating to the interests which you represent. The rapid expansion that has of late years marked the steel manufacture of those countries, is attracting the attention of iron and steel makers throughout Europe.

Your Secretary has received, during the past year, a number of communications from the West, principally from Indiana and Illinois, requesting facts and figures to be used in debating societies and lyceums in the advocacy of American industry. Believing it to be one of our most important provinces to furnish information of such a character, large numbers of pamphlets, writtten by our ablest political economists have been sent thither, together with many letters written in answer to special inquiries. We have reason to believe that our efforts in this way have been productive of good results. A gentleman residing in Western Illinois writes to us as follows:

"I am utilizing the documents that you were good enough to send me. We are upsetting free trade theories here pretty effectually; and I verily believe that the time is near at hand when the West will be as strong for protection as New England has been in the past, for I am afraid that she is not so reliable in this respect now as formerly. Western agriculturists have at last come to understand the reason why their lands are annually producing less grain to the acre, while that of Massachusetts and other manufacturing districts is annually producing more. We must renovate our soil, now being rapidly exhausted by the shipment of its productions hundreds of thousands of miles away for a market; this can only be done by consuming those productions at home. We see this now, and are working with that end in view."

This is a specimen of the many letters of similar character received at this office. We have also corresponded with some of the proprietors of a number of western and northwestern papers upon subjects that concern us, and we are glad to announce that in those States where a few years since few if any papers advocating protection were published, a large number of well-conducted and influential journals now advocate such a policy. The volume of statistical information collected and published by the association with considerable labor and expense, has frequently been consulted by members of Congress, government officers, students of political economy, and others, and has furnished the basis for the correct influences and arguments that have so often been used effectually in overthrowing the false and injurious statements of the ignorant and unthinking. We have given much attention to the importation of iron and steel at our many ports of entry, in endeavoring to prevent fraud by evasions of the letter and spirit of the laws relating to customs duties. The necessity for making these laws as clear and explicit as possible, that they may be readily and properly constructed by our customs officials has frequently been made apparent. The classification of iron and steel and manufactures thereof, in the tariff bill now before Congress, was prepared with this object in view, and is without doubt, more perfect in all its features than that in the existing or in any preceding act.

Our organization having now been in existence sufficiently long to become well known throughout the country as a determined and active champion of American industry, we are frequently called upon by the representatives of unorganized interests to aid in the circulation of petitions and memorials relating more or less directly to freeing our country from foreign commercial thraldom. As an example of this, we have within the past month, circulated a large number of memorials, urgently requesting Congress to abolish the *warehousing system*, a system fraught with evil, both to our government and the mass of the people, and alone tempting the importers and manufacturers of foreign merchandise.

During the past year the number of members of the Association has increased to 336, of which 27 are honorary and 309 contributing.

The report of the Treasurer, herewith submitted, will show the receipts and expenditures during the past year. A cash balance of $2,119 11 remained in his hands on the 1st of January, in addition to which he has in his care $2,000 in U. S. 5-20 bonds. Since the beginning of the present year we have received assessments amounting to $7,593 01, and expended $857 19.

In conclusion, we may advert to the following facts: That our organization has steadily grown in strength and efficiency from its incipient meeting in 1864; that ours is, we believe, the most powerful organized body of manufacturers that exists in our country; that as a body we can secure an attentive hearing where the grievances of an individual, or even a neighborhood, would be passed almost unnoticed; that among all the members east and west, north and south, the owners of furnaces, forges, steel works, rolling mills, nail mills and bloomaries, the interests possessed in common touching the tariff, taxation, transportation, emigration, improvements in machinery and processes, &c., &c., are overwhelming when compared with any petty local difference of individual interest which may arise. And in view of these facts, we believe that our members will see the importance of continuing their past efforts to increase our strength with the wonderful extension of the iron and steel interests in the United States. And that they will bear in mind that upon them devolve the grave duties of the actual representatives of hundreds of thousands of employés, and hundreds of millions of our country's capital. Respectfully submitted.

HENRY MCALLISTER, Jr., Sec'y.

## J. Ross Browne's Report on the Mineral Resources of the States and Territories west of the Rocky Mountains.

WASHINGTON, D. C., March 5, 1868.

*Hon. Hugh McCulloch, Secretary of the Treasury:*

SIR—In the preliminary report which I had the honor to transmit to you from San Francisco in November, 1866, a general summary was given of the mineral resources of the States and Territories west of the Rocky mountains. It was not anticipated by the department that the information required under letter of instructions dated August 3, 1866, could be obtained in full within the brief period intervening before the next meeting of Congress, but it was hoped that sufficient data might be collected to furnish a general idea of the rise and progress of the mining interest on the Pacific slope. No official document in any department of the Government contained accurate information on this subject, and it was considered desirable that special attention should be given to the following points:

1. The origin of gold and silver mining on the Pacific coast, and present condition of that interest, as tending to show the progress of settlement and civilization.

2. Geological formation of the great mineral belts and general characteristics of the placer diggings and quartz lodes.

3. Different systems of mining; machinery used; processes of reducing the ores; percentage of waste, and net profits.

4. Population engaged in mining, exclusively and in part; capital and labor employed; value of improvements; number of mills and steam engines in operation; yield of the mines; average of dividends and losses.

5. Proportion of agricultural and mineral lands in each district; quantity of woodland; facilities for obtaining fuel; number and extent of streams and water privileges.

6. Salt beds, deposits of soda and borax, and all other valuable mineral deposits.

7. The altitude; character of climate; mode and cost of living; cost of all kinds of material; cost of labor, &c.

8. Population of the mining towns; number of banks and banking institutions in them; facilities for assaying, melting and refining bullion; charges upon the same for transportation and insurance.

9. Communication with the mines and principal towns; postal and telegraphic lines; stage routes; cost of travel; probable benefits likely to result from construction of the Pacific railroad and its proposed branches.

10. Necessity for assay offices and public depositories; what financial facilities may tend to develop the country and enhance its products.

11. Copies of local mining laws and customs regulating the holding and working of claims.

12. Number of ledges opened; number claimed; character of the soil in the mining districts, and its adaptation to the support of a large population.

The preliminary report submitted in answer to these inquiries embraced such information as could be obtained within the brief period allowed for its preparation. Although imperfect in many respects, it was received by the people of the Pacific coast as an indication of a growing interest on the part of the Government in the development of our mineral resources. It was a source of gratification to the miners to find that, after years of unprofitable toil, during which they had contributed largely to the national wealth, the peculiar character of their occupation was beginning to be understood and its influence in promoting settlement and civilization to be better appreciated.

The report which I now have the honor to submit, is the result of many years of labor and exploration. It contains the aggregated experience of the ablest statisticians and experts on the Pacific coast. If there be any merit in the work, it belongs chiefly to my co-laborers, who have devoted themselves with such unselfish zeal to the promotion of the objects designed to be accomplished by this commission. The fund appropriated by Congress was insufficient to admit of compensation adequate to such labor; but assistance was cheerfully given, as a matter of public benefit, without regard to personal or pecuniary considerations.

When it is taken into view that this inquiry extends over the Territories of Utah, Arizona, Montana, Idaho and Washington, and the States of Oregon, California and Nevada, embracing an area of country stretching from the Rocky Mountains to the Pacific, and from Mexico to British Columbia; that in many parts of this vast mineral range travel is still difficult and expensive; that the business of mining is new to the American people, and the collection of statistics unsystematized in this department of industry, it will be conceded that as much has been accomplished as could reasonably be expected.

An erroneous idea prevails that the collection of mining statistics involves original explorations and detailed personal examination of every mine throughout the vast range of our mineral regions, with scientific and practical deductions relative to the treatment of ores; and it is expected, by some, that the information obtained shall be entirely new, and furnish a complete index for the purchase, sale, or working of every mine in the country. Apart from the fact that such an investigation would require the employment, for many years of a large scientific force, at great expense, it would be difficult even then to present statistics which had not already been made public. The same sources of information are open to all. The mining press of the country, closely connected with that interest, directly identified with its progress, in daily and familiar contact with its details, makes it a special duty to keep up the current record of cost and production, success and failure. There may be misstatement or exaggeration; but not more so on the part of the press, which is held to a certain accountability by public sentiment, than on that of individuals who may be prejudiced or irresponsible. Statements publicly made and thoroughly criticized are as likely to be correct as casual examinations made by persons visiting a special locality, unfamiliar with its growth and progress, and compelled after all to depend upon information derived from others. Nevertheless it must be admitted that there are difficulties in the way of absolute accuracy.

Every miner naturally desires that his mine should be carefully examined and reported upon in detail—especially if, as in the majority of cases, it be unproductive. Without reflecting that a mere list of the unproductive mines would fill a volume, the miner is disposed to estimate the value of a report by its mention, or omission of that in which he is most interested. However disposed a Government agent may be to meet the wishes of the mining community in this respect, it is equally important to bear in mind that this inquiry is not designed for speculative purposes, or the promotion of special or individual interests. The public desire reliable statements, and herein lies the difficulty—a spirit of exaggeration on the one hand, a demand for facts on the other. To afford satisfaction to all is impossible. I have, therefore, relied upon my own sense of fairness, and endeavored to present the truth impartially.

That errors may have been committed, and false statements given by interested parties is probable, but precaution has been taken to guard against them. The selection of assistants was made with reference to their integrity and capacity. Instructions were given to them in detail, enjoining careful scrutiny and verification of every statement. The revision of their work, under these precautions, has occupied more than four months.

There is no subject upon which greater difference of opinion exists than that of mining statistics. It is an open field on which there is room for discrepancy under any existing circumstances. No two persons rate the product of the precious metals alike. The superintendent of a mine often furnishes information which, when submitted to the board of directors, is pronounced incorrect. Representatives from the mining districts are apt to rate both population and products higher than persons who have made them special subjects of inquiry, but whose opportunities for judging may not be so favorable.

A fruitful source of error is in supposing that the ordinary channels of transportation cannot be relied upon as a clue to the gross products of the mines. It is alleged that large quantities of the precious metals are carried away in the pockets of the miners. Even if this were so, it is not reasonable to suppose that the miners continue to burden themselves with their treasure after arriving at their place of destination. It must find its way into the mint or branch mints for coinage, or the custom house manifests for exportation. It cannot be assayed without paying its internal revenue tax. The gross yield of all the mines can be determined with approximate accuracy. It is more difficult to arrive at a sub-division when it comes to the product of each State and Territory.

In California, for example, during the early days of placer mining, before the transportation of bullion by organized companies had become a business entitled to confidence, a large proportion of the gold derived from the mines was carried out of the country by private hands. There was comparatively little danger of loss. The routes to San Francisco were short, public, and protected by general interest. From that point to New York the passengers usually combined for mutual protection, and the risk was inconsiderable. It was not until the idle and the profligate began to obtain an ascendancy; the business of transportation by express more firmly established, and the mines more difficult to work with profit, that the increase of risks and the reduction of charges resulted in the general abandonment of this system. It doubtless prevails to a limited extent now, but the transportation of bullion by private hand in California is exceptional. It probably does not exceed seven per cent. in the aggregate, and this applies only to the routes by which it reaches San Francisco.

In reference to silver, it is impossible that any considerable amount can escape notice in this way. The yield of Nevada can be determined with more accuracy than that of other States. Silver predominates in the mines, and where gold is obtained it is not in uncombined form.

When we come to Montana, Idaho, Washington and Oregon, the greatest difficulty is experienced. Shipments of treasure from Montana and Idaho may become incorporated with others before reaching their destination. From Montana most of the bullion goes East. Two main routes are open to examination—one by the Missouri river, and the other by Salt Lake City. Indian disturbances and the insecurity of the roads have during the past year almost entirely closed the latter; so that the chief exit is by the former route. Shipments from Idaho are made chiefly by way of Portland, and the island stage route through Humboldt and across the Sierra Nevadas. On both of those routes it is alleged that they are liable to become merged with the products of other States and Territories. It has been impossible to obtain an account of the shipments from each agency at the express office of Wells, Fargo & Co., at San Francisco. For reasons of private expediency they refrain from giving the desired information. We have, however, the aggregate receipts at their office, and knowing very nearly what amount can be credited to California, Nevada, and British Columbia, can draw reasonable conclusions as to the proportion derived from Idaho, Washington and Oregon.

From the best information available the following is a near approximation to our total gold and silver product for the year ending January 1, 1867:

| | |
|---|---|
| California | $25,000,000 |
| Nevada | 20,000,000 |
| Montana | 12,000,000 |
| Idaho | 6,500,000 |
| Washington | 1,000,000 |
| Oregon | 2,000,000 |
| Colorado | 2,500,000 |
| New Mexico | 500,000 |
| Arizona | 500,000 |
| Add for bullion derived from unknown sources within our States and Territories, unaccounted for by Assessors and express companies, &c. | 5,000,000 |
| Total product of the United States | $75,000,000 |

The bullion product of Washington is estimated by the surveyor general at $1,500,000. That of Oregon is stated as high as $2,500,000. Intelligent residents of Idaho and Montana represent that the figures given in the above estimate, so far as these Territories are concerned, are entirely too low, and might be doubled without exceeding the truth. The product of Idaho alone, for this year, is said to be from $15,000,000 to $18,000,000. That of Montana is estimated by the surveyor general at $20,000,000. Similar exceptions are taken to the estimates of Colorado, New Mexico, and Arizona. As I have no grounds for accepting these statements, beyond the assertion that most of the bullion is carried away in the pockets of the miners, I am inclined to rely upon the returns of the assessors, express companies, and official tables of export. Admitting that a fraction over seven per cent. may have escaped notice, although reasonable allowance is made for this in the estimate of $70,000,000, and that a considerable sum may be derived from sources not enumerated, I feel confident the additional allowance of $5,000,000 is sufficient to cover the entire bullion product of the United States for the year 1867, thus making the aggregate from all sources $75,000,000, as stated in the report of the Secretary of the Treasury.

I have endeavored to obtain returns of the annual products of each State and Territory since 1848; but for the reasons already stated, and in the absence of reliable statistics, it has been impossible to make the necessary divisions with more than approximate accuracy. As nearly as I can judge from the imperfect returns available, the following in round numbers is not far from the total product:

| | |
|---|---|
| California | $900,000,000 |
| Nevada | 90,000,000 |
| Montana | 65,000,000 |
| Idaho | 45,000,000 |
| Washington | 10,000,000 |
| Oregon | 20,000,000 |
| Colorado | 25,000,000 |
| New Mexico and Arizona | 5,000,000 |
| In jewelry, plate, spoons, &c., and retained for circulation on Pacific coast | 45,000,000 |
| Add for amounts buried or concealed, and amounts from unenumerated sources, and of which no account may have been taken | 50,000,000 |
| Total | $1,255,000,000 |

This statement requires explanation. Up to 1855 a considerable portion of the gold taken from California was not manifested. In 1849 the actual yield was probably $10,000,000; in 1850, $35,000,000; in 1851, $46,000,000; in 1852, $50,000,000; in 1853, $60,000,000; and in 1854, $53,000,000. The amount unaccounted for by manifest was not so great after the last date. In 1861, Nevada and Idaho commenced adding their treasures to the shipments, so that after that date a deduction for the amounts produced from these sources would be necessary, if the manifest alone were taken as a criterion, in order to arrive at the product of California. An addition should be made for the amount retained for currency, estimated by some as high as $45,000,000, but probably not exceeding $35,000,000 or $40,000,000; and, for plate, jewelry, &c., of California gold, $2 000-000, and Nevada silver, $3,000,000. Incorporated in these shipments are the amounts received from Nevada, Idaho, Oregon, Arizona, Washington, and British Columbia; but these cannot be deducted from the manifest of exports, according to the express returns, since the proportions are not accurately known of the amounts retained and shipped, derived from separate sources.

The general condition of the mining interest on the Pacific Slope is encouraging. There have been fewer individual losses than during past years; and the yield of the mines has been comparatively steady and reliable. Fluctuations in mining stock have not been so great as usual; but those wild and injurious speculations which have impaired confidence in this great interest are gradually becoming narrowed down to individual operations, whose influence in the community is limited. Legitimate mining has been as prosperous as other pursuits; though it cannot be denied that there are uncertainties attached to this peculiar business which render it hazardous and require more than ordinary profits to make it remunerative, under the most favorable circumstances.

It may seem strange in this view that the gross product of bullion has been gradually diminishing for some years past; but a brief reference to the history of mining operations on the Pacific coast will explain this apparent anomaly.

The existence of gold in California was known long before the acquisition of that territory by the United States. Placers had long been worked, on a limited scale, by the Indians; but the priests, who had established the missionary settlements, knowing that a dissemination of the discoveries thus made would frustrate their plans for the conversion of the aboriginal races, discouraged by all means in their power the prosecution of this pursuit, and in some instances suppressed it by force. As early as December, 1843, however, Manuel Castanares, a Mexican officer, made strenuous efforts to arouse the attention of the Mexican Government to the importance of this great interest.

It is not my purpose to enter into a detail of the events preceding the discovery by Marshall on the 19th of January, 1848, or the subsequent excitement which resulted in the opening of the great placer mines, and the rush of immigration in 1849. Reference is made to these incidents in the history of California merely to show the changes in the character of the business. At first the gold was easily found and required but little skill in separating it from the loose gravel or sand in which it was embedded. Frequently it lay so near the surface in such quantities, and in grains of such form and size, that a simple pan or rocker comprised all the means necessary, with ordinary labor, to insure extraordinary profits. Mere will and muscle were sufficient to insure success.

Our people were inexperienced, but ingenious in devices for saving labor, energetic and industrious. Unskilled as they are, nearly all who went into the business realized handsome profits, and the reports of their success induced a rapid immigration from the At-

lantic States, South America, Australia, and other parts of the world. Thus towns were built up; a new and extensive commerce sprang into existence; lands were cultivated to supply the miners; roads were cut through the difficult passes of the mountains; steamboat and stage lines were established, and the country, from the western slopes of the Sierra Nevadas to the shores of the Pacific, for many hundred miles north and south, became suddenly filled with an industrious, intelligent, and enterprising population. Even in these early days, as the surface placers receded toward their sources, time and money were expended in the rediscovery of inventions which had been known to the Old World for centuries. With all the genius and enterprise of the American people, no important discovery in the way of machinery for mining was made which had not been long in use in South America, Mexico, or Europe.

The same necessities gave rise to identical contrivances for saving labor; and it is sufficiently creditable to our miners to say that without any knowledge of what others had done, they frequently improved upon the originals. The fact demonstrates very clearly that want of knowledge even in the preliminary stages of mining is a source of loss. When the precious metals are easily obtained, and the profits of individual labor are large, less injury results from ignorance than in the subsequent stages of the business, when capital is required, and the process of reduction is more complicated. Mining differs essentially from every other branch of industry. Unlike agriculture, there is but one crop in a mine. As the work progresses, the stock of mineral is decreased, and can never be replenished by any human art. There is no opportunity of recovering what has been lost or wasted. The farmer changes his crop or his system of cultivation, and his land can be improved and his profits increased by experience. So, also, in manufactures and other pursuits. Hence it is important that the experience of mankind should be preserved, so that error may be avoided.

Comparatively little progress was made in vein or quartz mining prior to 1860. Quartz veins containing the precious metals were discovered in California in 1850, and for several years experiments were made in working them, generally with loss. The Mexicans, with their arastras, were the only successful quartz miners. Experience in their own country enabled them to realize fair profits upon their labors. Their system of mining however, was too slow for an American population, to whom large investments of capital were of no consequence, provided there was a prospect of immediate and abundant returns.

The discovery and development of the Comstock lode in Nevada gave the first impulse of this kind of mining. The wonderful richness of that vein attracted attention at once, and drew from all parts of the world men of scientific attainments. By the developments made in working it the principle was established that quartz veins could be rendered a profitable source of supply on the Pacific coast. The experience thus gained impelled the adventurous miners of California to attempt new systems and devote themselves with great vigor to the opening and working of the gold bearing veins in that State. In 1860 the product from this source in California did not exceed $2,000,000. As the surface diggings gave out, a resort to vein mining became indispensable. The proportion of bullion now derived from various sources within the limits of the State is about as follows: From surface digging, $2,000,000; from *cement* or deep-lying placers, $14,000,000; from quartz mines, $9,000,000; total, $25,000,000.

Professor Ashburner estimates that about 80 per cent. of the gold is produced from the mines lying north of the Mokelumne. The production of the southern mines is diminishing every year, and the surface diggings will soon be exhausted. Wherever the latter predominate a sudden but ephemeral prosperity is engendered. General stagnation now prevails in these localities. Towns are depopulated, real estate is of little value, business is depressed. The population consists of hundreds in many counties where it formerly consisted of thousands. Reference to the accompanying reports will show the present condition of these localities. Good quartz veins exist in many of them, but the want of capital has retarded their development. Unskilled labor can make no further progress, and new fields of enterprise have been sought by those who formerly depended upon the placers. Some have pushed their way over the mountains into Idaho, Montana, and the other new Territories; others have given up mining and devoted themselves to farming, trade, or commerce. Similar changes have been experienced in Idaho, Montana, and other Territories in which surface mining attracted a population. At first the yield was large and easily obtained. As the surface deposits were worked up to their sources quartz veins were discovered, and machinery and skill became requisite. The difficulty of access to the more remote mineral regions increased the expense of transportation, and the uncertainty of remunerative results impaired confidence. History shows that these changes occur in all mining countries, and are inseparable from this branch of industry.

No uneasiness need be felt as to a decrease in the source of supply. After many years of travel over the mining regions, I feel justified in asserting that our mineral resources are practically without limit. Explorations made by competent parties during the past year in many parts of the mineral region hitherto unknown demonstrate the fact that the area of the mineral deposit is much larger than was ever before supposed. It is safe to assume that of the claims already recorded in the settled parts of the country, and known to be valuable, not more than one in a hundred is being worked; and of those worked perhaps not more than one in fifty pays anything over expenses, owing to mismanagement, inefficient systems of reducing the ores, want of capital, cost of transportation, and other causes susceptible of remedy. In many districts of Nevada silver ores of less value than $100 a ton cannot be worked by mill process as to pay expenses, and there are districts in Idaho and Montana where gold-bearing ores will not justify working unless they yield from $40 to $50 per ton. With such wealth of treasure lying dormant, it cannot be doubted that by the increased facilities for transportation and access to the mines soon to be furnished by the Pacific railroad and its proposed branches, and the experience in the treatment of ores, and the scientific knowledge to be acquired in a national school of mines adequate to the necessities of the mining population, the yield must eventually increase.

The adventurous Americans who take the lead in the development of these frontier regions are generally energetic and intelligent, but prone to extravagance and reckless speculations. No country in the world can show such wasteful systems of mining as prevail in ours. At a moderate calculation, there has been an unnecessary loss of precious metals, since the discovery of our mines, of more than $500,000,000, scarcely a fraction of which can ever be recovered. This is a serious consideration. The question arises whether it is not the duty of Government to prevent, as far as may be consistent with individual rights, this waste of a common heritage, in which not only ourselves, but our posterity, are interested. The miner has a right to the product of his labor, but has he a right to deprive others of the benefits to be derived from the treasures of the earth, placed there for the common good? The precious metals are of an imperishable nature, evidently designed to pass beyond the reach of the discoverer, and to subserve purposes of human convenience for generations. Our children have an interest in them, which we cannot with propriety disregard.

The bill to establish a national school of mines, introduced in the Senate at the beginning of the present session of Congress by Mr. Stewart, of Nevada, is designed to remedy this evil. Similar schools have been established in various parts of Europe, and the best evidence of their utility is the fact that we are indebted to them for nearly all the knowledge we possess on the subject of mining and metallurgy. Our mines and mills are practically managed by foreign experts; we furnish the labor and mechanical ingenuity, but they furnish the scientific skill. Without the aid of these foreign institutions, we could have made but little progress in mining; and yet we lose much by not having similar institutions in our own country. The local circumstances existing in Europe differ essentially from those which prevail in the United States. It would be a great advantage, not only in the saving of expense, but in the more direct availability of the experience gained, if our young men could learn at home what they are now compelled to learn abroad.

The plan proposed by Mr. Stewart's bill, seems both feasible and economical. Such an institution would, if properly conducted, result in a large annual increase in our bullion product. It is not unreasonable to anticipate that, instead of declining within a few years to forty or fifty millions per annum—as will undoubtedly be the case if the present state of things continues—there would be an increase amounting to at least one hundred per cent. on the yield of the mines for the past year. I venture to hope, therefore, that Congress will take this proposition into favorable consideration. The bill, as amended by the Committee on Mines and Mining of the Senate, and the considerations upon which it is based, will be found in the appendix.

It is proper that I should give due credit to my assistants for the part which they have taken in this work.

The duty of collecting statistics in California was entrusted to Mr. John S. Hittell, the able and experienced author of several valuable works on the industrial resources of that State. In the performance of the special service assigned to him, he visited the principal mining districts. His reports are based upon actual observation, and may be relied upon as accurate and impartial. With the exception of the report on Nevada county, by Mr. E. F. Bean, the county assessor, and Mr. H. Rolfe, his assistant, and the brief reports on some of the northern and southern counties, by Dr. Henry Degroot, with a sketch of the Morris Ravine Mine, by Dr. A. Blatchley, all the gold-bearing regions of California are described by Mr. Hittell.

Important papers on the condition of the mining interest in Mexico, South America, Australia, &c., are also furnished by the same authority.

An elaborate and interesting report on the Miscellaneous Minerals of the Pacific States and Territories, is furnished by Mr. Henry C. Bennett, a mining engineer familiar with the subject. No such complete and extended notice of the miscellaneous mineral productions of the Pacific coast has yet been published. His report will be found valuable to business men, and to all others seeking information as to the resources of the States and Territories west of the Rocky Mountains.

To Mr. R. N. Stretch, late State mineralogist of Nevada, the Comstock Lode and regions adjacent were entrusted. His scientific and practical knowledge of the various departments of mining; his long experience in this particular region: and his known integrity, rendered the selection peculiarly fortunate, as will be conceded upon a perusal of this report.

Doctor Henry Degroot, statistician and author, whom I deputed to travel through Nevada, has furnished a series of interesting papers on the miscellaneous resources of that State.

Mr. Meyran Angel, of Austin, a gentleman well acquainted with eastern Nevada, contributes a report on that region, from which it will be seen that the mineral wealth of Nevada is by no means confined to the Comstock Lode.

The services of Dr. A. Blatchley, a mineralogist and mining engineer, were secured for an exploration of Montana and Idaho. This gentleman travelled through these Territories during the months of June, July, and August, and was enabled to collect the information which is embodied in his reports.

Mr. Ellwood Evans, of Olympia, formerly Territorial Secretary of Washington, has kindly furnished detailed reports on the resources of that Territory.

To Mr. Ainsworth, Mr. Hill, Mr. Ladd, and others, I am indebted for information relative to the trade and resources of Oregon.

The report on Arizona is from the pen of Governor R. C. McCormick. It will be found extremely interesting.

Mr. W. M. Galt, of the State Geological Survey of California, whose recent expedition through Lower California has attracted considerable attention, contributes a detailed report on the mineral resources of that peninsula. It is the result of the first scientific exploration ever made of that region, and possesses a peculiar interest at this time, owing to the investment of American capital there, and the purchase from the Mexican Government of an extensive grant by private parties for colonization by Americans.

Many other prominent and experienced gentlemen have assisted me in the preparation of this report. I claim little more for myself than the direction and supervision of the work. It has occupied my entire time for upward of a year, and whatever may be its imperfections, few will be disposed to deny that it presents evidence of an earnest attempt to carry into effect the wishes of the department, and the objects designed to be accomplished by Congress.

It is a common error to suppose that mining is inimical to the welfare of the people. No branch of industry, requiring mechanical skill and the acquisition of scientific knowledge, can justly be said to contain in itself elements injurious to public morals or to the prosperity of the State. The tendency of this pursuit is at first to attract a reckless and adventurous population, whose disregard of conventional restraints leads to the assumption of risks, and to bold and hazardous undertakings by which new countries are most rapidly opened up to settlement and civilization. Providence so ordains it that the superficial treasures of the earth, designed to attract this enterprising class, soon disappear, and a higher order of inteligence is required, and a more permanent condition of things is established. It is only necessary to look back over the last eighteen years to find in the advancement of the vast region, known as the Pacific slope, the strongest possible refutation of the fallacy that mining is inimical to the welfare of the people. Looking forward to the future, who can predict the high condition of prosperity likely to be attained by these new States and Territories eighteen years hence—with trans-continental railroads and telegraph lines binding the Atlantic to the Pacific; with branch roads and lines traversing the country north and south; with the commerce of Asia pouring its treasures into our seaports; with an export trade commanding the whole Eastern world; with a probable coast-line stretching from the Behring Straits to Cape St. Lucas; with innumerable flourishing cities and seaport towns; with an agricultural population numbering thousands where they now number hundreds; with busy manufactures scattered over the land; with churches, schools and colleges everywhere throughout the mountains and valleys—these many of us may live to see: but few can now realize the magnificent future that lies before us. In this famed land the laborer, the artisan, the mechanic, the man of science, can each find profitable employment and a congenial home. As we want population to develop the dormant wealth of our new States and Territories, it is the interest of our Government to disseminate a correct knowledge of their material resources.

Entertaining these views, I trust the report herewith submitted will not be without practical utility wherever it may be circulated.

Very respectfully your obedient servant.

J. ROSS BROWNE.

# Mining Summary.

## GOLD AND SILVER.

### Arizona.

The new placer diggings, four miles south of Prescott, still continue to yield gold pretty freely. During the past week, says the *Miner* of February 1 we learn that several persons have been making very well. In five days one panned out the sum of $60. All who are at work in the diggings are doing well. Letters from Wickenburg all speak in glowing terms of the Vulture mine and mill. Wickenburg & Smith are taking out very rich quartz, and their stamp mill will be started soon. The news from the quartz mining districts adjacent to Prescott is favorable.

### New Mexico.

Late advices from Santa Fe tell of an expedition, composed of between one and two hundred men, provisioned and equipped for two months, and under the direction of experienced mountaineers, to start on the 1st of March from Abiquiú for the Navajo country to search for some gold mines said to exist somewhere in that region. The Indians have for many years reported the existence of exceedingly rich placers in their country, but have never been induced to let their exact locality be known. It is thought that if the placers do really exist they will be found by these prospectors.

### Georgia.

The Madoc (Canada) *Mercury* of February 29 says: Mr. Scott will leave Madoc to-day on his way to Georgia—an event we alluded to some weeks ago as likely to occur—to take charge of the management of the gold mine owned by Mr. Gill, about two miles from Alatoona. Mr. Scott goes to introduce the Scott & Taylor improvements on the Wyckoff process, and will have the whole charge of the mine and the works, upon which $120,000 has already been expended.

### Dakota.

The *Frontier Index*, published at Fort Sanders, says: A party of French prospectors, lately from the Sweetwater mines, have just discovered incredible deposits of gold and silver within fifteen miles of Sanders. Four of the party brought in several specimens of gold, silver and copper quartz on Saturday, which were thoroughly tested. and prove to be as rich as any discoveries ever made, either in Montana or California.

### Canada.

The following is extracted from a letter written by Dr. T. Sterry Hunt, dated Montreal, February 22, 1868, with reference to the Empire mine: "In accordance with my promise, I have examined the specimens of ore taken by me from your mine in Madoc Village, last November. The ore consists of a mixture of sulphuret of antimony and copper, with some pyrites and arsenical iron. An assay of a selected specimen from a small vein, gave me for the ton of 2,000 lbs.:

| | |
|---|---|
| "Gold, 4⅝ oz | $96 46 |
| Silver, 57 1-6 oz | 73 74 |
| | $170 20 |

"By crushing and washing 3½ pounds of an average sample, there were obtained 13 per cent. of rich ore, still holding one-fourth its weight of spar, and yielding for 2,000 pounds, as the mean of two assays:

| | |
|---|---|
| "Gold, 9 7-10 oz | $206 50 |
| Silver, 120 7-10 oz | 155 70 |
| | $362 20 |

"This, it should be understood, refers to the ton of dressed ore; the wall-rock of dolomite or magnesian limestone gave me only a trace of gold."

The Madoc *Mercury* of February 29 has the following items of news: We learn that several enterprising gentlemen have purchased Messrs. Turley & Gibert's crushing mill at Lower Eldorado, and have also leased, with the privilege of purchase. the Reduction Works of Messrs. Daniels, Scott & Taylor .....Mr. Anstee has received instructions from Mr. Lombard to drive a tunnel and sink a shaft on his part of the Richardson hill, as soon as the snow goes off. A small building will also be put up for carrying on a series of experiments in amalgamating processes, and if these give an average yield of $10 of gold to the ton, a substantial stone building will be erected in August next.

### Mexico.

A correspondent of the *Tribune* writes from the City of Mexico, February 6: "Propositions have been sent to Congress from Sinaloa, Jalisco, and elsewhere, to rescind the law prohibiting the export of gold or silver bullion, and to allow these metals to go free in and out of the country; or, in case a duty is imposed, to make it no more than three per cent. of the value..... The mint of Alamos coined $93,703 in silver in November last, and that of Hermosilla $41,000. The average coinage at all the mines in the last ten years has been a little more than $15,000,000, which is a falling off. The mineral district of Caloree, in San Luis, is said to be in a low state, owing to want of capital. Other districts are in in a better condition The cost of extracting ore at La Luz is $30 per monton of ore of 3,000 lbs. The mines of Pachuca, Real del Monte, and one or two others, have suffered a decline, partly from bankruptcy, and partly from want of ore.....The *Diario Official* publishes the project for a railroad and telegraph from the boundary line of the United States, leaving Presidio del Norte, on the Rio Grande, and running to the Gulf of California. The line from Mexico to connect with it would be 700 miles, at a calculation of $65,000 per mile, and it is proposed to open it to the public by 1876. The object has been presented in the names of Messrs. Columbus Douglass, Jesse Hoyt, Bangs, Barney, Ogden, and others of New-York and the West, and it is said that Gen. Fremont is also financially interested in it. The capital stock is reported at 150,000 shares of $100 each. The company can also issue mortgages to a certain amount on each mile, and are disposed to ask aid in the way of a loan of credit from the government. The only question is, will the government grant a concession?"

### New Brunswick.

"The indications of gold in this county and in the adjoining county of Victoria," says a recent writer from Woodstock, "are beginning to excite no little attention. Some very fine specimens of gold-bearing quartz have been found, from time to time, in the drift of several streams, and the attention of a number of practical men—among them practical miners—having been excited, examinations and experiments have been carried on for the past two years. The results have been very encouraging—so much so, that several shrewd men have secured mining leases for twenty-five years, from the Government, of extensive tracts of ungranted lands in Carleton, Victoria and Northumberland counties. Small experiments made in 'panning' and 'sluicing' in the beds of several streams which run into the River St. John, have shown the existence of gold in large quantities. Specimens have, I think, been sent on to Boston. I saw the other day four or five dollars' worth of dust, the result of about one day's shovelling and sluicing of one man, performed last autumn. When the spring opens, investigations and experiments will be commenced on a larger scale, and the question as to whether gold washing on the Upper St. John can be made a profitable business will probably be settled. We need very much a thorough geological survey and examination of the Province, with special reference to the discovery of workable and profitable mines of useful minerals; and we hope that our local Legislature, which met on the 13th inst., will make necessary provision for such an investigation."

## OIL.

### Pennsylvania.

The Titusville *Herald*, of March 5, has the following oil items: Messrs. Abbott & Co., have constructed a new iron tank in their oil yard, near the railroad track. It is to be used for storing crude oil, and it has a capacity of six thousand barrels of 43 gallons each. Another new tank is being erected on the side hill, on the south side of the creek, nearly opposite the passenger depot. It is to be of a capacity of about five thousand barrels. This is the tenth iron tank at Titusville, and when it is completed there will be a total capacity of iron tankage of about fifty-six thousand barrels of 43 gallons. There are now but about six thousand barrels of oil in tank at this point, leaving about forty-five thousand barrels of tankage barrels empty.....A new iron tank, of twenty-four thousand barrels capacity, is to be erected at Miller Farm. Operations will be commenced as soon as the weather will permit. The tank is to be owned by Cleveland parties.....The Hassan well, near Reno, was started up last week, and it is now producing nearly three hundred barrels per day. .....The Tomlinson well, on Bull Run, producing twelve barrels per day, was purchased a day or two since by Mr. W. C. Chapin, of the Caldwell farm .....A new well is being put down about half way between Pleasantville and Shamburg, for the purpose of testing the territory in that vicinity.....The Henderson Farm, situated a few rods south of the Shamburg wells, on Upper

Cherry run, is to be thoroughly tested.....The engine house of the Getty well, on Bennehoff Run, caught fire on Saturday morning last, and was entirely destroyed. The loss was small.

## MARKET REVIEW.

FRIDAY EVENING, March 13, 1868.

**Gold and Silver Stocks.**—The transactions at the board to-day were very limited. Rocky Mountain declined to 18c.; Smith & Parmelee to $2 70; Quartz Hill to $1 05, and La Crosse to 48c. Edge Hill continues to rise, and yesterday sales were made at $3 75; to-day, on a weak market, it brought $3 70; Montana was sold at 67c., and was quite firm; Manhattan Silver is still held at $160, and Twin River at $75. Quotations range:

| | Bid. | Asked. | | Bid. | Asked. |
|---|---|---|---|---|---|
| Alameda Silver | 80 | 1 00 | Keystone Silver | — 2 | — 3 |
| American Flag | — 60 | 70 | La Crosse Gold | — 49 | 50 |
| Atlantic and Pacific | — 40 | — — | Liberty Gold | — — | 4 |
| Bates & Baxter Gold | — — | 1 00 | Manhattan Silver | 140 00 | 160 00 |
| Benton Gold | — — | 30 | Midas Silver | — 60 | 85 |
| Black Hawk G | 4 00 | 5 00 | Montana Gold | — 68 | 70 |
| Bobtail Gold | 1 00 | 2 00 | New York | — 50 | 66 |
| Bullion Consolidated | — 50 | — 75 | New York & Eld'o | — — | 1 75 |
| Columbian G. & S. | — 3 | — 6 | Nye Gold | — 3 | 4 |
| Combination Silver | — — | 65 30 | Ouwy Mining | 15 00 | — — |
| Consolidated Gregory | 3 55 | 3 70 | Ophir Gold | — — | — — |
| Corydon Gold | — 34 | — 38 | People's G. & S. of Cal | — — | 25 |
| Edgehill Mining | 3 70 | 4 00 | Quartz Hill | 1 05 | 1 10 |
| Gold Hill | — — | 4 00 | Reynolds Gold | — — | — 3 |
| Gunnell Gold | — 90 | 1 10 | Rocky Mountain Gold | — 17 | — 19 |
| Gunnell Union | — — | 40 | Smith & Parmelee Gold | 2 65 | 2 75 |
| H'n G & S. bs | — — | 92 | Sensenderfer | 5 50 | 8 00 |
| Harmon G. & S. bs | — — | 2 50 | Symonds Fork Gold | — — | — 90 |
| Holman | — 5 | 10 | Texas Gold | — 6 | — 15 |
| Hope Gold | — 10 | 20 | Twin Riv Sil | — — | 75 00 |
| Kipp & Buell Gold | — 5 | 15 | Vanderburg G | — — | 15 |

**Copper Stocks.**—Sales of Davidson were made yesterday at 40c. The market to-day was thus quoted:

| | | | | | |
|---|---|---|---|---|---|
| Caledonia C | — — | 10 00 | Hilton | — — | 1 00 |
| Canada | — — | — 50 | Minnesota | 3 00 | 3 50 |
| Davidson | 41 | 45 | Rockland | .... | 4 00 |
| Gardiner Hill | — — | 1 50 | Knowlton | — — | 2 00 |

**Petroleum Stocks.**—Buchanan Farm found purchasers yesterday at 37@38c; to-day sales were made, b.30, at 41c., and s.3, at 40c. At the board this afternoon prices were thus quoted:

| | Bid. | Ask'd. | | Bid. | Ask'd. |
|---|---|---|---|---|---|
| Bennehoff Run | 1 60 | 1 85 | N. Y. and Alleghany | 1 25 | 3 00 |
| Brevoort | 25 | 35 | Fit Hole Creek | 60 | 85 |
| Buchanan Farm | 38 | 41 | Rathbone Oil Tract Co | .... | .... |
| Central | 35 | 60 | Rynd Farm | 8 | 12 |
| Clinton Oil | 50 | 1 10 | United Pet. Farms | .... | 12 |
| Manhattan | .... | 10 | United States | 1 95 | 2 10 |
| National | .... | 3 00 | Union | 1 25 | .... |

**Miscellaneous Stocks.**—Cumberland Coal, 35; Del., Lack. & W., 114; Del. & Hudson, 150; Central Coal, 47½; Mariposa Pref., 10½; Quicksilver, 20@21; New York Central, 127¾; Erie, 75½; Reading, 92¾; Michigan Southern, 89¾; Pittsburg, 93¾; Northwestern, 65; Northwestern Pref., 73½; Toledo, 106¾; Rock Island, 95½; Fort Wayne, 100½; Pacific Mail, 111½; Adams' Ex., 74@74¼; American, 68½; United States, 70¼@71; Wells, Fargo & Co., 39¼@39½; Merchants' Union, 35 per cent., 34@34¼.

**Government Stocks** are quite firm at our quotations. At London, Five-Twenties being quoted at 71⅞@72.

| | |
|---|---|
| U. S. 6s, 1881, reg | 110¾@110⅞ |
| U. S. 6s, 1881, coupon | 111⅛@111¼ |
| U. S. 5-20s, 1862, regular | 107 @ — |
| U. S. 5-20s, 1862, coupon | 110⅝@110¾ |
| U. S. 5-20s, 1864, coupon | 107¼@107⅜ |
| U. S. 5-20s, 1865, coupon | 108½@108¾ |
| U. S. 5-20s, July, 1865, coupon | 106¾@106⅞ |
| U. S. 5-20s, July, 1867, coupon | 106⅞@107 |
| U. S. 10-40s, reg | 101 @101½ |
| U. S. 10-40s, coupon | 101¼@101⅜ |
| U. S. 7-30s, June, large | 105⅞@106¼ |
| U. S. 7-30s, July, large | 105⅞@106¼ |

**Foreign Exchange** is weak and dull. We quote:

| | |
|---|---|
| London, (prime bankers')60 days' | 109⅜@109½ |
| London, (prime bankers') sight | 109¾@109⅞ |
| London, prime commercial | — — |
| Paris, (bankers') long | 5.16⅞@ 5.15⅝ |
| Paris, (bankers') short | 5.14⅜@ 5.13⅛ |
| Antwerp | 5.18¾@5.16¾ |
| Swiss | 5.18¾@5.16¾ |
| Hamburg (bankers') | 36 @36⅛ |
| Amsterdam (bankers') | 41⅛@41¾ |
| Frankfort (bankers') | 41 @41⅛ |
| Bremen (bankers') | 79⅛@79¾ |
| Berlin (bankers') | 71⅜@71⅝ |

**Gold** has declined during the week, being quoted at 139½c. at 2 P.M., to-day. The stock of bullion in the Bank of France, is now over £44,000 000.

The steamship "Constitution" sailed on the 10th instant, from San Francisco, for Panama with $362,000 in treasure—$347,000 was for New York, and on the 29th ult., the steamship Sacramento sailed, with $654,000 in treasure—$649,000 of which was for New York.

The following will show the exports of specie from the port of New York for the week ending March 7th, 1868:

| | |
|---|---|
| Total for the week | $1 543 290 |
| Previously reported | 11,252,016 |
| Total since January 1, 1868 | $12,795,306 |
| Same time in 1867 | 5,746,117 |

**Copper** has been quiet but firm at 23¾@24c.; for Detroit, 23½@23¾; for Portage Lake, 23½; and for Baltimore, 23¼. The sales do not exceed 300,000 to 400,000 lbs., including Detroit, 24½ for the 15th April.

The English market had advanced on the 9th inst. to £73 10s. for Chili, against £71 on the 29th inst.

**Tin** is depressed. Straits is sold by the dealers at 23½; Banca, small parcels, sold at 27½; English is held at 23½. The English market was steady on the 29th of February at 90 for Straits. The Dutch half-yearly sales of Banca, was advertised for the 31st of March. 51,000 lbs. will be sold against 71,000 lbs. in March, 1867.

**Spelter** quiet at 6¾ for Silesian.

**Lead** steady at 6¾ to 6¾, for ordinary foreign.

**Pig Iron**—American, is quoted $90 for No. 1. Scotch pig has advanced to $72@$73, in yard, for Glengarnock, No. 1.

**Petroleum** is quiet. Crude is scarce and firm, but refined in bond is heavy and lower. Naptha is dull at 17c. We quote: Crude (40@47 gravity) in bulk, per gallon, 13½c; crude (40@47) in bbls. 18@18½c.; refined, in bond, (110 test), prime light straw to white, 25c.; refined, in bond, (110 test), standard white, 25½c.; residuum, per bbl., $3 50.

| | | |
|---|---|---|
| Receipts for the week, ending March 10 | pkgs | 5,191 |
| Exports for the week | gallons | 662,854 |
| " from Jan. 1st | " | 7,575,024 |
| " same time last year | " | 4,577,855 |

## THE SLATE TRADE.

The types made us say, last week, that all the principal Pennsylvania depots "have a supply of slate," when it was our intention to have conveyed just the opposite impression. At these places there is little or no stock on hand, hence in order to meet the spring trade it is imperative that work be resumed at once at the quarries, to supply its demand. During the week past there has been a slight change for the better in trade in this city.

## THE IRON TRADE.

NEW YORK, March 13, 1868.

American Pig Iron is rather quiet but firm, with some sales of No. 1 at $40, and No. 2 at $38. Scotch Pig Iron is very strong, and a little higher. Sales of 100 ton lots from yard have been made at from $42 to $43. We also note the sale of 200 tons No. 1 Summerville to arrive at $42; also 100 tons Glengarnock on private terms.

### Weekly Statement of New York Imports.

The following table shows the quantity and value of iron and steel imports at the New York Custom House, for the week ending and including March 6, 1868:

| | QUANTITY. | VALUE. |
|---|---|---|
| Chains and Anchors | 26 | $2,406 |
| Iron, hoop, tons | 14 | 553 |
| Iron, pig, tons | 706 | 9,686 |
| Iron, Railroad bars | 6,176 | 26,901 |
| Iron, other, tons | 839 | 18,913 |
| Steel | 3,067 | 65,298 |
| Total value | | $96,996 |

### Boston Imports of Pig Iron from January 1 to March 7, 1868.

| | 1868. | 1867. |
|---|---|---|
| From Great Britain, tons | 1,313 | 8,475 |
| Coastwise Ports | 3,154 | 1,069 |

### Lehigh Valley Iron Trade.

The following table shows the amount of Pig Iron transported over the Leigh Valley Railroad for the week ending March 7, 1868: and for the season to hat date.

| From | Tons. | Total |
|---|---|---|
| Carbon Iron Co | 100 | 2,010 |
| Lehigh Valley Iron Co | 100 | 1,950 |
| Thomas Iron Co | 410 | 4,890 |
| Lehigh Crane Iron Co | 410 | 2,570 |
| Allentown Iron Co | 150 | 625 |
| Robert Iron Co | 220 | 2,020 |
| Glendon Iron Co | 200 | 3,220 |
| Other shippers | 220 | 1 810 |
| Total | 1,810 | 19,095 |

Our Correspondent writes that the snow storm prevented shipments the early part of the week.

### San Francisco Iron Imports from January 16 to Feb. 1, 1868.

| | | | |
|---|---|---|---|
| Iron, Bars | 16,331 | Hoop, bundles | .... |
| bundles | 3,949 | Pipe, pcs | 1,052 |
| Plates, no | 2,142 | bundles | 689 |
| cs | 5,309 | cs | .... |
| Pig, tons | 493 | Railroad bars, no | 3,457 |
| Hoop, cs | 45 | Steel | .... |

### Market Prices.

NEW YORK, March 13, 1868.

DUTY.—Bars, 1 to 1¼c. per lb.; railroad, 60c. per 100 lbs.; boiler and plate, 1½c. per lb.; sheet, band, hoop and scroll, 1¾ to 1¾c. per lb.; pig, $9 per ton; polished sheet, 3c. per lb. Payable in gold.

| | | | |
|---|---|---|---|
| Anthracite, No. 1, best. $40 00@ | — — | Swedish Iron. | |
| " " 2x, fdry, 38 00 | — — | 1⅛x⅜ to ⅝ and ⅞ to 2 in sq | 155 00 |
| " Grey Forge, 32 00 | 35 00 | 1⅛x⅜ to ⅝x⅞ " | 160 00 |
| Scotch Pig, from yard | 42 00 | 44 00 | 6 to 12x⅜ to 5-8 | 165 50 |
| Charcoal, coal blast | 50 00 | 60 00 | Common Iron | |
| Old Wrought sc'p, fm yd. | 47 50 | — — | ⅜ to 2 in. round and sq | .... |
| " " " fm. vsl. | 43 00 | — — | Refined Iron. | |
| English rails, gold | 52 00 | 53 00 | ⅜ to 2 in. r'd and sq | 95 00 |
| American " at works. | 75 00 | 78 00 | 1 to 6 in. wide x ⅜ to 1 th | 90 00 |
| Old Railroad Iron | 46 00@ | .... | 3¼ and 3½, round and sq | 105 00 |
| RETAIL PRICES. | | | Rods—5-8 and 11-16, round & sq., per ton | 100 00 |
| Hoops, ⅝ per ton | $190 00 | | ⅛ and 9-16 round & square | 105 50 |
| " ¾ " | 160 00 | | 7-16, round and square | 115 00 |
| " ⅞ " | 150 00 | | ⅜, " " | 120 00 |
| " 1 " | 140 00 | | 5-16, " " | 125 00 |
| " 1¼ " | 137 50 | | ¼, " " | 130 00 |
| " 1¼ to 2 per ton | 137 50 | | 3-16, " " | 160 00 |
| Scroll Iron—¾x14 per ton | 180 00 | | Horse Shoe Iron | 125 00 |
| " 12 " | 170 00 | | Band—1 to 6 in. x 3-16 to No. 12 | 130 00 |
| " 10 " | 160 00 | | Ovals and half Rounds. | |
| " 3-16 " | 150 00 | | ⅜ to 1⅜ | 120 00 |
| " ¼ " | 140 00 | | ⅜ & 11-16 | 125 00 |
| " ¾x14 " | 160 00 | | ½ & 9-16 | 130 00 |
| " 12 " | 160 00 | | Nail Rods, per lb. | 9@10 |
| " 10 " | 150 00 | | Norway Shapes | 8¾c |
| " 3-16 " | 140 00 | | Spring Steel | —@ 9¾ |
| " ¼ " | 135 00 | | Tire " ⅞ to 1¼x¼ & 5-16 | 10½c |
| " ¾x14 " | 150 00 | | Toe Cork Steel | 10½c |
| " 12 " | 150 00 | | Sleigh Shoe Steel | 10¼c |
| " 10 " | 140 90 | | Plow Steel—6 to 14x¼ to ⅜ | 10c |
| " 3-16 " | 135 00 | | | |
| " ¼ " | 132 00 | | | |
| Swed'h I'n, ord'y sizes | 150 00 | | | |

BOSTON, March 11, 1868.

| | | | |
|---|---|---|---|
| Swedish—common ass'd | $150@155 | Scotch Pig, No. 1 | .... |
| English—com | 85 90 | Gartsherrie | $42@.. |
| do refined | 95 100 | No. 1, other brands | 40 42 |
| do sheet, per lb | 6½@10c. | American, No. 1 | 40 45 |
| Russia, sheet | 15@16c | | |

## THE COAL TRADE.

NEW YORK, March 13, 1868.

We find the trade in an excited condition. Coal is scarce for immediate delivery, and shipping facilities are poor—vessels being very difficult to be chartered at any price. We, however, hear freights quoted a shade lower; but at best we consider all quotations nominal, until there is really coal to be sold for immediate delivery, and boats to be had at the calling. The past few days of warm weather has loosened many of our Eastern and river points from the icy grasp of winter, and we find buyers who have been without coal during the past month, in the market for a supply.

We learn nothing as yet from the Lehigh companies, as regards prices or freights. All the other leading corporations have arranged their prices for the season, and what they are waiting for, it is hard to tell, unless Macauber like, for "sumthin' to turn up." We hear no more growling from our Pottsville contemporary, in regard to the disgraceful monopoly of the Reading railroad, and the advantages of other sections over the Schuylkill. Why are you not then up and doing, now you have an opportunity, while the Lehigh folks are waiting each for the other? The cream of the trade is to be had while they are debating some old and long exploded policy. The gist of the matter is, we are vexed that the trade should be disorganized at this late period in the season, apparently to satisfy a particular idea of some fossil member of the Lehigh council, and that when the general trade in majority are endeavoring to regulate business to a solid basis, they create a speculative tendency by compelling other dealers to make contracts at great risks, or throw the trade away, which is no doubt just what they desire, though not *exactly* right.

No report from the "Bunnell, jr." petition to have the tolls on the Morris Canal made nett. We wait a reply.

The Pittsburg *Commercial* of the 11th inst., reports the ice in the Monongahela and Allegheny rivers, pretty well cleared out. The first spring run of coal, it says, require 43 tow boats, and the export will reach nearly 4,500,000 bushels. Most of the boats will leave immediately on the rise. The greater part of the coal is destined for Louisville and Cincinnati.

The Luzerne *Union* is authority for the statement that the Northern Coal and Iron company have recently purchased a very valuable property in Plymouth township, comprising all of the Boston Coal company's land and the Plymouth Coal company's property, together with the bridge across the Susquehanna at Plymouth and the railroad connecting these lands with the railroad on the east side of the river. These lands comprise about 1,200 acres.

As soon as our rivers and bays are open we shall begin the publication of freights from different points, as heretofore. Our Baltimore correspondent sends the following:

"The B. & O. R. R. Co., has consented to a reduction of forty cents per 2,000 pounds, on George's Creek and Cumberland coal, and fifty cts. per 2000 pounds on gas coals, to take effect on and after Monday next, the 16th inst.

The freights are now,

| | |
|---|---|
| From Cumberland to Baltimore, per 2,240 pounds | $2 58 |
| " Piedmont " " " | 2 97 |
| On gas coals, | |
| From Newburg to Baltimore, per 2,240 pounds | $5 04 |
| " Fairmount and Clarksburg to Baltimore, per 2,240 pounds | 5 60 |

The following table exhibits the quantity of Coal passed over the following routes of transportation for the week ending March 7, 1868:

| | 1867. | | 1868. | | INC. OR DEC. | |
|---|---|---|---|---|---|---|
| | WEEK. | YEAR. | WEEK. | YEAR. | WEEK. | YEAR. |
| Phil. & Reading R. R. | 38 670 | 266,908 | 26 837 | 493,656 | d 11,833 | d 226,748 |
| Lehigh Valley R. R. | 25,425 | 277,619 | 17,533 | 454,780 | d 9,891 | d 177,161 |
| Scranton North | 7,536 | 61,419 | 1,749 | 69,635 | d 5,787 | d 8,216 |
| " South | 26,066 | 209,966 | 7,972 | 175,498 | d 18,084 | d 34,468 |
| Penn'a Coal Co. Rail. | 17,620 | 71,798 | 3,863 | 87,228 | d 13,747 | d 15.430 |
| Shamokin | 5,718 | 54 344 | 6,166 | 57,826 | i 448 | i 3,482 |
| Trevorton | .... | 3,866 | .... | 4,834 | .... | i 968 |
| Short Mountain | 37 | 3,582 | 540 | 5,879 | i 503 | i 2.297 |
| Lykens Valley C. Co. | 142 | 5,001 | 1,308 | 14,604 | i 1,166 | i 9,603 |
| Broad Top | 4,247 | 31,073 | 4,373 | 27,431 | d 126 | d 3,642 |
| W'mstown Col'y, E. | 800 | 10,738 | 1,601 | 20,677 | i 800 | i 9,939 |
| Total | 96,251 | 996,314 | 71,942 | 1,412,048 | ..... | ..... |
| | ..... | 1,412,048 | 96,251 | ..... | ..... | ..... |
| Increase | ..... | 415,734 | d 25,309 | ..... | ..... | ..... |

### Schuylkill Coal Trade.

BY RAILROAD, FOR WEEK ENDING MARCH 12, 1868.

| | |
|---|---|
| St. Clair | 27,441 |
| Port Carbon | 4,347 |
| Pottsville | 875 |
| Schuylkill Haven | 14,785 |
| Auburn | 1,645 |
| Port Clinton | 6,453 |
| Total for week | 57,046 |
| Previously this year | 493,656 |
| Total | 550,702 |
| Same time last year | 306,844 |
| Increase | 243,858 |

### Cumberland Coal Trade.

From the Alleganian.

By B. & O. RAILROAD.—The shipments over the Baltimore and Ohio Railroad, for the week ending March 14, were as follows:

| | |
|---|---|
| From Cumberland & Pa. R. R., via Cumberland: | |
| Consolidation Company | 1.105 16 |
| Borden do. | 331 13 |
| New Hope do. | 391 02 |
| Midland do. | 56 09 |
| From George's Creek via Piedmont. | |
| George's Creek C. & I. Company | 555 12 |
| S. M. " | 37 16 |
| Central " | 869 17 |
| Atlantic " | 451 13 |
| Piedmont " | 163 08 |
| Swanton " | 316 03 |
| Potomoc " | 959 18 |
| Franklin " | .... |
| George's Creek Mining | .... |
| Hampshire " | 1,352 18 |
| Total | 6,592 06 |
| From Eckhart Railroad. | |
| C. C. & I Co | 409 18 |
| Total | 7,002 04 |

### Report of Coal Transported over Lehigh Valley Railroad

For the week ending March 7, 1868, and previously this season, compared with same time last year:

| WHERE SHIPPED FROM. | WEEK. Tons. Cwt. | PREVIOUSLY Tons. Cwt. | TOTAL. Tons. Cwt. |
|---|---|---|---|
| Total Mahanoy | 3,541 07 | 74,180 02 | 77,721 09 |
| " Hazleton | 8,527 09 | 213,105 00 | 221,632 09 |
| " U. Lehigh | 781 01 | 16.080 10 | 16,361 11 |
| " B. Meadow | 2.464 19 | 74,317 09 | 77,464 08 |
| " Wyoming | 2,036 09 | 59,064 09 | 61.100 18 |
| Grand Total | 17.533 05 | 437.247 10 | 454,770 15 |
| Same time 1867 | 25,424 19 | 252.194 02 | 277,619 01 |
| Increase | ..... | 185,053 08 | 177,161 14 |
| Decrease | 7,891 14 | ..... | ..... |

### San Francisco Coal Trade.

[From the Commercial Herald, Feb. 18.]

Imports from January 1st to Feb. 16th:

| | | | |
|---|---|---|---|
| Anthracite, tons | 9,233 | Coos Bay | 1,354 |
| Australian, tons | 980 | English, tons | 2,202 |
| Bellingham Bay, tons | 2,800 | Mt. Diablo, tons | 12,812 |
| Cumberland, cks | 945 | Nanaimo tons | 3,348 |
| Chili, tons | 308 | | |

There is a good demand at low prices for all descriptions, but the few transactions making, are, to a great extent, covered up by parties purchasing. Under existing circumstances, it is difficult to give the true bearings of the market. We, however, quote Australian, $13@14; Chili, $12 per ton; Bellingham Bay, $11@11 50; California, $7@9; Cumberland, cks., $21@22; Cumberland, bulk, $18@19; Lehigh, $15@16; Liverpool, $14; Pittston, ton, $16; Scranton, $15; Scotch, $14; Vancouver's Island, $13.

## Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

### At New York, March 13, 1868.

| | | | | | |
|---|---|---|---|---|---|
| Schuylkill R. A., choice | $ | @$ | Lehigh Broken | 5 25 | .... |
| " Ordinary | .... | .... | " Egg | 5 25 | .... |
| " W. A., Lump | .... | .... | " Stove | 6 00 | .... |
| " Steamboat | .... | .... | " Chestnut | 4 75 | .... |
| " Broken | .... | .... | Wilkesbarre Lump | 5 00 | .... |
| " Egg | .... | .... | " B'ken & Egg | 5 50 | .... |
| " Stove | .... | .... | " Stove | 6 00 | .... |
| " Chestnut | .... | .... | " Chestnut | 4 75 | .... |
| Lehigh White Ash Lump | 5 75 | ... | | | |

SPECIAL COALS.—DEALERS' QUOTATIONS.

| | | | | | |
|---|---|---|---|---|---|
| Diam'd Vein R. A., | Sch'kill | .... | .... | Broad Mountain | .... .... |
| Locust Dale W. A., | " | .... | .... | Buck Ridge W. A., | Sh'kin. .... .... |
| Honey Brook " | Lehigh. | 5 50 | .... | H. Helm, E. P'klin, | Lorb.. 5 50 .... |
| Harleigh " | " | 5 50 | .... | New England Red Ash | .... 5 25 .... |
| Spring M'n " | " | 5 50 | .... | Wyoming | .... 5 00 .... |
| Sugar Creek " | " | 5 50 | .... | Locust Mount'n (Reppller) | 5 50 .... |
| Ashburton " | " | 5 50 | .... | Duncan Red Ash | " 6 00 .... |
| Fulton White Ash | .... | .... | .... | W'barre Coal & Iron Co | .... .... |
| Stout | .... | .... | .... | New Burgh Orrell Gas Coal | .... .... |
| Old Co.'s " | " | 5 50 | .... | Despard Gas Coal | .... .... |
| Mt Pleasant | .... | 5 00 | .... | | |

Dealers in these Coals may be found in our advertising columns.

### At Philadelphia, March 13, 1868.

| | | | |
|---|---|---|---|
| Lehigh Lump and St'mb't | @ | Schuylkill Chestnut | 2 75 .... |
| " Broken and Egg | .... .... | Locust Mount Lump and Steamboat | 4 00 .... |
| " Stove | .... .... | " Broken | 4 00 .... |
| " Chestnut | .... .... | " Prepared | 4 25 .... |
| Schuylkill R. A. Prepared | 4 25 4 50 | " Chestnut | 2 87 .... |
| " Chestnut | 2 75 .... | Lorberry Coal | 4 25 .... |
| " W. A. Lump and Steamboat | 4 00 .... | Shamokin | 4 75 .... |
| " Broken | 4 00 .... | Franklin, (Lykens Valley) | 4 75 .... |
| " Egg and Stove | 4 25 .. | Broad Top | 4 75 .... |

### Scranton Coal at Elizabethport, March 13, 1868.

(Corrected weekly by D. L. & W. R. R. Co.)

| | | | |
|---|---|---|---|
| Lump | $4 00@.... | Egg | 4 75 .... |
| Steamer | 4 25 .... | Stove | 5 50 .... |
| Grate | 4 75 .... | Chestnut | 4 25 .... |

### Prices for Pittston Coal at New York, March 13, 1868.

(Corrected weekly by Penna. Coal Co.)

| | | | |
|---|---|---|---|
| Lump, per ton of 2240 lbs. | $5 40@.... | Egg " " " | 5 40 .... |
| Steamer, " " " | 5 40 .... | Stove " " " | 5 60 .... |
| Grate " " " | 5 40 .... | Chestnut " " " | 4 90 .... |

### Lackawanna at New York, March 13, 1868.

| | | | |
|---|---|---|---|
| Lump | $4 10@.... | Egg | $4 10@.... |
| Steamer | 4 10@.... | Stove | 4 30 .... |
| Grate | 4 10@.... | Chestnut | 3 90 .... |

### Lehigh Coal at Elizabethport, March 13, 1868.

| | | | |
|---|---|---|---|
| Lump | 5 00@.... | Chestnut | 4 50 .... |
| Steamboat and Broken | 5 00 .... | Stove | 5 50 .... |
| Egg | 5 00 .... | | |

### Wilkesbarre Coal at Elizabethport, March 13, 1868.

(Corrected by Wilkesbarre Coal & Iron Co.)

| | | | |
|---|---|---|---|
| Lump | $4 50 .... | Egg | 5 00 .... |
| Steamer | 4 50 .... | Stove | 5 25 .... |
| Broken | 4 75 .... | Chestnut | 4 50 .... |

Ten cents additional on shipments from Jersey City.

### At Baltimore, March 13, 1868.

| | | | |
|---|---|---|---|
| Wilkesbarre & Pittston W. A. by car | $5 50@5 75 | From wharf or yard, 75c. to $1 per ton additional. | |
| Lykens Valley R. A. by car | 5 75@ 6 25 | Retail, del'd, per 2,240 lbs | 7 00@7 75 |
| Sunbury & Shamokin R. or W. A. by car | 5 50 5 75 | George's C'k and Cumberland f. o. b. at Locust P't for shipping | 4 60@4 75 |

### At Havre de Grace, Md.

| | | | |
|---|---|---|---|
| Wilkesbarre or Pittston, W. A., on board | $4 85@5 10 | Sunbury or Shamokin, R. or W. A., on board | ....@5 25 |
| | | Lykens V'y, R. A. on b'd | 5 60@5 85 |

The above rates are only nominal. Shipping at this port is suspended for the season.

### At Georgetown, D. C.

George's Creek and Cumberland on board $....@ 4 50

## Coal Freights.

(Corrected Weekly.)

### From Elizabethport.

| | | | | | |
|---|---|---|---|---|---|
| Albany | $ 90@— | — | New London | 2 00@ | 2 25 |
| Boston | 3 25 | 3 00 | Newport | — — | 2 25 |
| Bridgeport | 1 75 | — — | New York | 70 | — — |
| Fall River | 1 75 | — — | Norwalk | 2 00 | — — |
| Hartford | — — | — — | Norwich | — — | — — |
| Hudson | — — | — — | Pawtucket and towing | 3 50 | — — |
| Lynn | — — | — — | Portland | 3 25 | — — |
| Middletown | — — | — — | Portsmouth | 2 50 | — — |
| New Bedford | — — | 2 25 | Providence | 2 25 | — — |
| Newburyport | 3 00 | — — | Salem | 3 25 | — — |
| New Haven | 1 75 | 2 00 | Taunton | 2 00 | — — |

### Foreign Freights.

New Castle and Ports on Tyne £16 keel.
Liverpool 15s. 6d.@16s. ton.

## SAN FRANCISCO STOCK MARKET.

A Telegram from San Francisco, dated March 11th, to Messrs. LEES & WALKER, Bankers, 33 Pine street, this city, quotes Nevada silver and other stocks as follows:

| STOCKS. | Bid per Ft. | STOCKS. | Bid per Ft. |
|---|---|---|---|
| Gould & Curry | 575 | Belcher | 230 |
| Savage | 3,200 | Imperial (per share) | 250 |
| Cholar Potosi | 170 | Alpha | 1,350 |
| Ophir | 175 | Kentuck | 275 |
| Hale & Norcross | .... | Cal. Steam Navigation Co | .. |
| Crown Point | 1,775 | Cal. State Telegraph Co | 31 |
| Yellow Jacket | 1,175 | Greenbacks | .. |

AMERICAN

# Journal of Mining.

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NEW YORK, SATURDAY, MARCH 14.

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## MINING LEGISLATION.

The Legislative Assembly of the Province of Ontario, Canada, has just passed an Act, respecting gold and silver mines, of a somewhat extraordinary character. As the text of this law fills three columns of the large sheet of the Toronto *Globe*, we shall not undertake to reproduce it in full. A brief analysis of its contents will, however, not be uninteresting.

The first three sections are merely enacting clauses and definitions of terms. The fourth section provides for the creation, by orders in Council, of mining divisions out of the territory of the Province; and the fifth, for the appointment of inspectors and other officers for the said divisions. Each inspector has jurisdiction as Justice of the Peace over his division, "with power to settle summarily all disputes as to extent or boundary of claims," etc. In the same summary manner, the inspector may decide claims for wages, and the like, and proceed to "levy on the defendant."

According to the seventh and following sections, the inspector of any mining division may grant, in consideration of five dollars, a miner's license for one year, authorizing the licensee personally, and not through another or others, to explore and mine for gold and silver during that period, on any unsold and unclaimed crown lands in that division. The licensee may stake out one claim on the said lands, and work the same.

The eleventh section fixes the size of claims as follows:

"FOR ALLUVIAL MINES.—If on any river or creek, 160 feet front, twenty feet front by 100 feet to the rear, to be measured from the water's edge. If on a small creek or minor stream, forty feet front by fifty feet to the rear, to be measured from the centre of the stream. If in a gully, sixty feet along said gully, and to extend from hill to hill. If on a surface or hill-side digging, 100 ft. square. Except where a company intend to hill-tunnel, then, upon application, the officer for the division may grant such larger claim as he may think fit. And for working a bed of a river, the officer shall determine, as circumstances may require, the size and position of claims; and all side lines shall be drawn as nearly as possible at right angles to the general course of the stream, for half a mile on each side of the claim, where such lines touch the stream.

FOR QUARTZ MINES.—For any one person, one hundred and fifty feet along a lead, by one hundred feet on each side thereof, measuring from the centre of the lead. Companies of two or more persons, who each hold a miner's license, may stake out and work additional feet along a lead by the above width, in the proportion of 100 additional feet in length for every additional miner, not to exceed one thousand feet in length altogether, and work the claim jointly. The inspector for the division shall decide as to each claim, under which of these heads it shall be classed; and his decision shall be final."

According to the thirteenth and following sections, claims must be as far as possible, quadrilateral and rectangular, all measurements taken horizontally, and *the ground under the surface considered as bounded by vertical lines.* A claim is to be deemed forfeited and abandoned when unworked for *one week* (!) unless the inspector is satisfied that reasonable cause exists for the intermission. Disobedience of the Act, or neglect to renew license, also works forfeiture. Discoverers of new mines only are entitled to work two claims, if they report the discovery immediately; otherwise, they are altogether excluded from mining on the crown lands for one year. To be considered "new," the alleged discovery must be, if on a known lead, at least three miles from the nearest known mine on the same lead; if on a lead hitherto unknown, at least one mile at right angles from the course of the nearest known lead; and, if in alluvial workings, at least two miles distant from any previously discovered mine.

Any person found fraudulently removing stakes, is punishable with a fine not exceeding $20 and costs, or imprisonment for not more than one month; the violation of any of the innumerable provisions of this Act, not otherwise punishable, entails a fine of $20 and costs for each day during which the said violation continues. The cheapest crime in which a man can indulge, under this law, therefore, is that of "jumping a claim," since he is not only liable to the least punishment, but, unless he is fool enough to be caught in the very act, there is no provision for punishing him at all.

The royalty imposed by this Act upon all gold and silver mines (whether on crown lands or private property) is *not less than two, nor more than ten per cent. of the gross amount of gold and silver mined!* In order to secure the payment of this royalty, it is provided that all mills and machinery for extracting gold or silver must be licensed, under bonds and penalty, and must keep for the inspector, commissioner or assistant commissioner of crown lands, or any one they may authorize, a clear and distinct statement of the quantities, owners, localities and actual yield of all quartz crushed or amalgamated, and the date of every operation. Heavy penalties are imposed upon failure to comply with these requirements or to pay to her Majesty the percentage of gross yield demanded by the Order in Council for the time being, to wit, not less than two, nor more than ten, per cent.

"No earth, clay, quartz, stone, mineral or other substance containing gold or silver" can, without the consent in writing of the inspector for the district, be removed beyond the division in which it was "found, procured or mined," on penalty of forfeiture. The business of sending specimens to New York and elsewhere, would receive a severe check, if some obstinate inspector should insist that the selected samples must first be crushed and amalgamated in a licensed mill, and her Majesty's share of the bullion set aside.

The remaining provisions of the law interest us but slightly, except the final section, which virtually declares that nothing in this Act shall prevent the Lieutenant-Governor from doing as he pleases in regard to mineral lands, granting and leasing them, by order in Council, on any terms he may see fit to prescribe. If the Lieutenant-Governor is a man of sense, he will use this reserved power to the annihilation of the complicated and unwise law which the Assembly has promulgated.

In conclusion, we call attention to a few of the fatal mistakes embodied in this enactment.

1. It creates a class of officials, the inspectors of divisions, who are little better than petty tyrants. Their decisions are generally final; they have power to make law and to enforce it. Yet no particular qualifications are required of them. There are few men in the province of Ontario, capable and willing to fill such positions; and certainly no capitalist will care to put his money at risk under the dictation of an officer who may declare the whole of his property forfeit, if he stops work for a week.

2. The vertical measurement of claims beneath the surface is well enough for alluvial workings, but the American system of following the vein, wherever it goes, is found to be much better in quartz-mining. Who would expend capital on a vein dipping 45°, with the certainty that, at the depth of a hundred feet, it would pass out of his ground into his neighbor's?

3. The tax of from two to ten per cent. upon the gross proceeds is oppressive, and will certainly defeat the end for which we presume it was imposed. Mining industry will be discouraged and paralysed by such a policy, and the revenue of the State from this source will soon dry up entirely. American capital will avoid a region so cursed with stupid and illiberal legislation; and neither her Majesty nor any one else will derive benefit from the treasures locked up in the rocks of Ontario.

4. The law contains no wholesome restrictions on the recklessness or wastefulness of miners. It is full of petty contrivances for securing fees and royalties; but it does not prevent the man who pays his taxes regularly from wasting two-thirds of the gold in his claim, robbing it in such a way that, when he chooses to abandon it, it is ruined for future operations.

The true policy is not to oppress the miner with taxes which are so many temptations to him to spend as little as possible in permanent improvements, and to realize as much immediate profit as possible, in the spirit of "*après nous le déluge*;" but rather to remove restriction, encourage the miner, and demand only that his labors shall be carried on with due foresight and economy, that the treasures of future generations shall not be squandered. The government which is content to see its mineral resources ignorantly or recklessly wasted, if only a certain per centage of the immediate profits reaches its coffers, is recreant to the trust placed in its hands.

## BENSON'S GEOMETRY.

In another column will be found a communication from Mr. LAWRENCE S. BENSON, in reply to the criticisms which we made upon his new manual of geometry. Perhaps our readers will think we have pushed editorial courtesy beyond its proper limits, in allowing this gentleman to occupy so large a space with a discussion which will be merely ridiculous to mathematicians, and wearisome to everybody else. In fact, our original review was called for, not by the importance of the work itself, but by the astounding fact that such a piece of absurdity has been puffed by responsible journals, recommended by eminent professors, and adopted for use in our public schools. The same circumstances justify us in publishing Mr. BENSON'S defence, which, taken together with our former observations, is quite sufficient to establish the character of his mathematical reasoning. We said the book was "obscure," "loose," "contradictory," "ungrammatical," "incoherent," "illogical," "polemical," "garrulous," "not scientific" and "absolutely false." We have no desire to apply these harsh terms personally to Mr. BENSON. He is incapable of comprehending the force of any criticism, and severity towards him would be mere wanton cruelty. He is one of those unfortunate persons who have become crazy over the old problem of the quadrature of the circle. Much learning (and little knowledge) have made him mad.

Our severest censure is due to those sane persons who have encouraged the publication of this book, and, moved by indolence, or mistaken pity, or worse motives, have contributed to its endorsement as a proper text-book for the young. We shall not mince matters with these parties. We refer, among them, more particularly to Prof. DECHARTY, of the College of New York, Prof. FOX, Principal of the Free Schools of Cooper Institute, Mr. RANDALL, Superintendent of the Public Schools of N. Y., the New York *Tribune*, the *Scientific American*, and the *New York Association for the Advancement of Science.*

These respectable men and institutions find themselves in a strange position. Either they did, or did not, examine this work before giving it their approval. In one case they are positively incapable; in the other, evidently unworthy to fill the position they occupy in public estimation. They ought not to be ignorant that Mr. BENSON is circulating far and wide their favorable opinions of his book. One of the passages in his letter to us, which we cut out as having nothing to do with his "argument," consists of a letter received from a schoolmaster in reply to the BENSON circular addressed "To Teachers in the United States." This teacher says he has a class of ten young men in Geometry, who have completed four books of LEGENDRE, and are anxious to send back their present text-books, and take the new ones in their place. Have Messrs. DECHARTY, FOX and RANDALL nothing to say, in view of the mischief which their hasty action is causing? Nothing can excuse them for so abusing their position and influence. The only partial retrieval in their power is an immediate public disavowal of the opinion they have uttered. As for the *Tribune* and the *Scientific American*, it is not so important that they retract their puffs. Newspapers generally prefer to keep silent when their errors are exposed, hoping to live down the contempt of the public, and determined, at all events, not to add their own testimony to that of everybody else, establishing their incompetency.

As for Mr. BENSON, his book, his propositions, scholia and what not, we cannot waste more time and space upon them. Any one who takes the pains to read his letter to us, will see that he undertakes to show that it is possible for a circle, the radius of which is unity, to have the area 3, while an inscribed polygon in the same circle has the area 3.12+. The frankness with which he accepts this result of his "direct method" entirely disarms our critical wrath. We are content to leave him to his harmless hallucinations—so long as they are harmless. But for those who would foist this sort of science upon the educational system of this or other cities, we have no such pity. This is but an aggravated instance of a daily evil. All our school boards are infested with the manufacturers and vendors of school-books; and nothing is so worthless or slovenly that some "Professor" cannot be found to lend it his approval, and aid in getting it "introduced." It is one of the greatest hindrances to the scientific education of the masses, that our school-books are too often the work of hack-writers, book-makers by profession, and not adepts in that of which they treat. We know of single men who have turned out from their busy manufactories text-books in every department, from rhetoric to chemistry. Very naturally, such machine-made books are imperfect and behind the age. They are made up from older books by wiser men, and they do not represent the present standpoint of the science of which they treat. But ignorance, favoritism, or good-natured indolence, secures their adoption by school boards; and writers of ability, who can neither work so cheaply nor solicit so impudently, do not attempt to compete with these contractors' rings.

The Geometry which we have taken so much pains to expose, is perhaps worse than the worst of these machine school-books. We do not call it an average specimen. But the

reckless endorsements it has received are average specimens —neither more nor less. Eminent men, journals and associations, are doing just such foolish things every day.

Here we take leave of this particular case. Our columns will be open for explanations and retractions from the gentlemen who are, by their fault, involved in the ridicule attached to Mr. BENSON's theories; but we do not propose to continue the discussion of the theories themselves. The quadrature of the circle is almost too trite to be served up every week.

### THE ROYAL SCHOOL OF MINES.

If any further argument is required to show the wisdom of maintaining a national school of mines as an independent institution, it will be furnished by a comparison between the Royal School of Mines in London and the *Ecole de Mines* of France or the *Bergakademie* of Saxony.

The Royal School of Mines is a sort of appendage to other scientific institutions. Its laboratories and lecture-rooms are scattered about London. It has no public openings or distribution of degrees, prizes, &c.; it issues no independent publications; and, after an existence of seventeen years, it is scarcely known, and certainly not appreciated, by the British public. As for foreign students, seeking to obtain the advantages of its three years' course, we have never heard of them. Americans in great numbers annually enter the continental schools, preferring to study in vigorous and prosperous institutions, even under the inconveniences attending the use of foreign languages.

The professors of the Royal School are not excelled in their respective departments by any similar body of men in the world. We need only mention the names of HUXLEY, TYNDALL and FRANKLAND to confirm this assertion. Yet these great men have obtained their reputation by researches and discussions so entirely outside of the art of mining, that most of their admirers do not even know them as professors of a mining school. Except the admirable lectures of WARINGTON SMYTH, published by the private enterprise of English journals, the Royal School gives little evidence of its existence and distinctive object.

Compare this dead-alive condition with that of the Saxon Academy. There, too, the professors are eminent men. The names of WEISBACH, COTTA, RICHTER, GAETSCHMANN, BREITHAUPT and SCHEERER are scarcely less illustrious than those of their great predecessors, WERNER and PLATTNER. But their fame is the glory of the Academy itself. Every one of them has applied his genius and acquirements to the improvement of the art of mining, and the upbuilding of the celebrated school from which, as from a luminous centre, the knowledge of that art has streamed forth into all lands through a hundred years.

The natural result has been an *esprit de corps* among the students, an enthusiastic support of the old *Alma Mater*, and a career of uninterrupted usefulness and constantly increasing celebrity. There are fifty American students to-day at Freiberg. How many are there at the Royal school of London?

The *Ecole de Mines* is also an independent and a successful establishment, though it labors under the disadvantage of being located in a capital city, and not in a mining district.

The Columbia School of Mines, in this city, is already one of the largest in the world; and although it cannot yet claim a perfect equality in all respects with the completely equipped and long-established institutions of Europe, it has taken the first great step towards a distinct and effective activity, in acquiring for itself a separate corps of instructors and a separate organization. At the outset it was but an appendage, a surbordinate department, to Columbia College. Now, it would be difficult to decide whether the college or the school of mines is the main body.

The necessity for an independent national school of this character has been sufficiently demonstrated. The spirit of American industry and progress demands that it shall not be a mere nominal affair, like that of Great Britain, but a practical vigorous and successful school, accessible to the population of our great mining regions, and administered so as to secure the great end for which it should be established: the increase of the profits of capital and labor employed in mining, the multiplication of sound mining enterprises, the protection of the natural resources of the country, and the promotion in these ways of a true and permanent national prosperity.

### Correction.

A supplement to the London *Mining Journal*, containing its index for 1867, includes also a description of the Gerstenhofer Terrace Furnace, credited to the *Scientific American*, and headed "Silver Smelting in Colorado." Our cotemporary will please take notice that the said description is an extract from an editorial article in the AMERICAN JOURNAL OF MINING. We do not claim the heading, however. The terrace furnace, as every one knows who knows anything about it, is not used to smelt silver ores, nor any other ores. It is a roasting furnace; and its use in Colorado is to desulphurize auriferous pyrites. Whoever cut out that article from the MINING JOURNAL seems to have known neither where it came from nor what it was.

☞ A French patent has recently been granted for a new process for the production of sulphuric acid. Its great recommendation is that in the improved method all large leaden chambers are dispensed with. The sulphur or pyrites is burned in compressed air, and the sulphurous acid, first washed to free it from arsenic, etc., is then brought into contact with the nitric vapors in a small leaden chamber of peculiar construction.

## NEW PUBLICATIONS.

THE QUICKSILVER MINING COMPANY has issued in pamphlet form the reports and exhibits made at the annual meeting of the stockholders, held at New York, Feb. 26, 1868. According to these documents, the production of the New Almaden mines during 1867, was 24,461 flasks of 76½ lbs. each. The largest production was 2,550 flasks, in December; the smallest, 1,600 flasks, in September; the monthly average, 2,038 flasks. The BARRON contract, which called for 50,000 flasks, was filled as follows: in 1866, 20,765 flasks were delivered; in 1867, 18,860 flasks, making 39,565 in all, and leaving 10,435 to be delivered before the expiration of the contract, March 31st, 1868. As the company had 9,349 flasks still in hand at the close of 1867, the contract has been filled without difficulty. The floating debt of the company at the commencement of the year 1867, was $154,985 in gold, and $50,000 in currency. At the close of the year, it had been reduced to $44,089, gold, and $32,000, currency, and at the annual meeting the managers felt authorised to make to the stockholders the statement, that after payment for the remaining quicksilver under the BARRON contract, that is to say, before the first of April next, the balance of floating debt remaining, will be covered by the value of quicksilver on hand. This is encouraging, and highly creditable to MESSRS. BOND, BARLOW, BUTTERWORTH, and their associates. During the three years and a-half of Mr. BUTTERWORTH's management, the mines have produced 131,517 flasks of quicksilver, at a cost of about two and a-half millions of dollars, and a net gain to the company, on the mining operations proper, of $1,747,420. Mr. BUTTERWORTH says: "The net gain to the company in the year's mining operations, amounts to the sum of $286,571. The result is less favorable than that of 1865 or 1866, and is due mainly to the low grade of ores, and the increased difficulties of extracting them. The mine has been very poor during the year, but it has seen darker days than the present. During the ten years and eleven months that it was worked by the BARRONS, the average monthly yield was only 2,312 flasks. During this period, there were many months when the mine was absolutely bare of ore, and seemed to be entirely exhausted. During the present month, some of the *labores*, particularly the 'Sacramento,' have materially improved." The report of the Engineer, Mr. HENRY JANIN, is complete and well-arranged, showing the amount of work done in the different *labores*, the production of ore, and its cost. Mr. JANIN says: "the production of ore from the mine, for 1867, is within 3,719 *cargas* (558 tons) of that of 1866. This production must be held as very satisfactory, when it is considered that there was a great falling off in several *labores*, which had been comparatively very productive the year before. The production could only be maintained by neglecting no ore seams, however small, and by following up all indications which promised to lead to ore deposits. The mines have been worked during the whole of the past year very energetically, and to their full capacity.

MONEY is the title of a brief pamphlet by Mr. GEO. S. LANG, of Philadelphia, who says, among many other acute things, "Money represents value; but value is not a thing, nor does it reside in things. Value is demand, desire, esteem, want, wish—it is a power existing in persons—the motive-power of the population—a power that may be represented immediately, if necessary. But it may also be represented through the medium of the dollar, at a fixed rate per capita. When this is done, by proper authority, true money will exist." We gather that Mr. LANG distinguishes between gold money, credit money, and true money; that he considers true money to be irredeemable paper money, regulated in amount by law according to the population. As he remarks, "the true dollar will be inscribed in paper; but on what else is a death-warrant or a pardon inscribed? Are these of no value because they are not inscribed on gold?" We cannot discuss at length this consistent but extreme and utopian theory of finance, which seems to ignore the well-known evils of an irredeemable (even when not redundant) paper currency, and the fact that no nation, in this age, can legislate value into that which other nations regard as worthless.

# Scientific Meetings.

### POLYTECHNIC BRANCH OF THE AMERICAN INSTITUTE.

The regular weekly meeting of the Polytechnic branch of the American Institute was held last Thursday evening, at Room No. 24 of the Cooper Union, with Mr. S. D. Tillman in the chair. Some time was consumed by the members and scientific gentlemen present in the examination of inventions recently patented—among them a concentric clasp, or "chuck," for holding a drill to perforate machinery; also, an apparatus to facilitate the flow of water to the top floors of buildings. After which all attentively listened to the reading of a pamphlet—which the author, Prof. A. L. Fleury, proposes to publish—on "Gold: its history, nature, and relations to other elements, and the best methods for its extraction." The Professor held, with the books extant upon the subject, that gold was found in a crystalized state; but thought a divergence from the teachings of these would give other results, and that the precious metal could be found, if only looked for, in many situations beside the 60 or 70 combinations in which it has been already discovered. The subject was illustrated by a variety of samples of quartz, and diagrams of apparatus in use for the extraction of the gold from its baser surroundings.

# Correspondence.

[To insure insertion of correspondence in our columns, the full name and address of the writer must be given.]

### A Reply to the Criticisms on "Benson's Geometry."

NEW YORK, March 5, 1868.

EDITOR AMERICAN JOURNAL OF MINING:

It is worthy of note that in the same issue of this Journal (February 29, 1868), where you have published your criticisms upon my Geometry, you have made the following statement: "Agassiz remarked that all new facts in science have to run a certain gauntlet; when first announced the public voice denounces them as impossible; when demonstrated to be facts, the cry is, 'They are anomalies, contrary to the laws of nature;' when shown to be entirely in accordance with natural laws, we exclaim, 'Oh, everybody knew that before.'" It is remarkable, because you have written your own condemnation, inasmuch as your tirade upon my Geometry is due to the undisguised fact that you deem the *exact* area of the circle *impossible* to be obtained, and also deem my solution an anomaly contrary to established propositions of Geometry. * * * * Your own words are, "Mathematics is *the* exact science. Its achievements, so far as they have gone, are final; its rules are unchangeable; they cannot be debated like the canons of taste or the maxims of philosophy." This is precisely the view I wish you to take, because I endorse it as correct, and we have a *common* standpoint. Now, we shall see whether you have proved recreant, or I am "obscure," "loose," "contradictory," "ungrammatical," "incoherent," "illogical," "polemical," "garrulous," "not scientific" and "absolutely false." Geometry is a branch of Mathematics, consequently, *geometrical* truths are *exact*—any proposition which is not *exactly true* cannot be a *geometrical* proposition, because *we agree* that "Mathematics is *the* exact science."

Again: CARNOT in his "Reflexions sur la Métaphysique du calcul Infinitésimal," states. "In their more difficult researches, and particularly in those relative to curve lines and surfaces, the ancient geometers had recourse to the *method of exhaustion*. Admitting no demonstrations but such as are perfectly rigorous, *they did not consider it consistent with the strictness of geometrical reasoning to regard curve lines as polygons of a very great number of sides*, but when they proposed to investigate the properties of any curve, they regarded it as the fixed term to which the inscribed and circumscribed polygons continually approach, in increasing the number of their sides, *The continued approximation of these polygons to the curve, afforded an idea of the properties of the latter, the more accurate as the number of sides was greater.*" And Davies' Legendre, whom you quote, Twelth proposition, Book fifth, has the enunciation: "*Problem*—To find the *approximate* area of a circle whose radius is unity," and in the second scholium to that proposition, we find the *statement*, "Hence no sensible error can arise in *supposing* that what is true of such a polygon is also true of its limit, the circle. *Indeed, the circle is but a regular polygon of an infinite number of sides.*"

You endorse DAVIES' LEGENDRE Book V. Prop. XV., which is based upon the Twelfth Proposition—an "approximate" result—also, based upon a "supposition" inconsistent with "the strictness of geometrical reasoning" as conceived by the ancient geometers and contradictory to the definitions for the circle and polygon, given by *all* geometers. Thus, your endorsement proves you *recreant* to your own words. "Mathematics is *the* exact science." And a very simple proof of the fallacy of the propositions you endorse from DAVIES' LEGENDRE, can be shown from the first scholium to the Twelfth Proposition by which it is erroneously concluded that *when the areas of the polygons approach to an equality with the circle, their perimeters will approach to an equality with the circumference.* Because this conclusion contradicts the established truth of geometry:—*That among isoperimetrical figures the circle has the greatest area*; and because the conclusion is a manifest absurdity as it would make the circumscribed polygon, circle, and inscribed polygon equal to one another, or, *a part equal to a whole.* Hence, we can very reasonably conclude that in order to obtain a *geometrical* solution to the *geometrical* problem of the circle—we must not use a method of demonstration "inconsistent with the strictness of geometrical reasoning" but we must employ a method perfectly consistent with *established* rules of procedure.

The *reductio ad absurdum* is not conclusive, neither is it legitimate. In this species of reasoning, a supposition is made which is contrary to the conclusion to be established. On this assumption, a demonstration is founded, which leads to a result contrary to some known truth. Thus, reducing the contrary of the proposition to the impossible, an absurd conclusion is derived—an inevitable consequent of the absurd assumption—not proving the proposition, but showing the absurdity of reasoning from *false* premises. You state, "*Axioms themselves depend upon the same reasoning.*" I differ.—*Axioms* depend on no such reasoning, because they must be so evidently clear, that *no* process of reasoning can make them more so—otherwise, they are not *axioms;* and the *fact* that this process of reasoning can prove an *axiom*, shows its *illegitimacy* and *inconclusiveness.* The instance you cite as illustrative of the *reductio ad absurdum*, is *prima facie* no illustration at all. And the *other* fact, that the *reductio ad absurdum* agrees with the method of *approximation*, which has been shown to be *contradictory* of an established truth of geometry, and a *manifest absurdity*, sufficiently demonstrates its illegitimacy and inconclusiveness. The *reductio ad absurdum* is not a *negative* demonstration, because in the latter no absurdity is assumed, and the former is, *per se*, an absurdity. Therefore, I have shown you, that neither the method of *approximation*, nor the *reductio ad absurdum*, can obtain the *exact* or *geometrical* solution of the problem of the circle; and since no *approximate* result is a *geometrical* conclusion, because "Mathematics is *the* exact science." The problem of the circle being a *geometrical* question, its *exact* or *geometrical* solution is *demonstrable.* For this demonstration we must use some recognized principle of procedure, which I have done in my geometry—Book VI., Prop. 17, Cor. 2.

There I use the same principle which has been employed for more than *two thousand years* to prove the proportion between the *cone, sphere*, and *cylinder*—that is, *comparing solids generated by sections around an axis.* I also show in the third corollary to the same proposition—and by *Geometrical Analysis*—pages 216 and 217—that the conclusion thereby derived is perfectly consistent with *established* truths of Geometry—which consistency cannot be sustained for the method of *approximation* and the *reductio ad absurdum.** * * * Your criticisms are due to the concluding paragraph of your article, which can be embraced in the following query—"If the area of an inscribed polygon of sixteen sides in a circle whose radius is unity, is 3.12+ as Mr. BENSON admits, then how can the area of the circle be less?" In BENSON'S GEOMETRY, Book V. Prop. XXV, Schol. 1, and Book VI. Prop. XVII Schol. 2; I have discussed this point, and I will state that this discussion has been submitted some years ago to eminent mathematicians, and though it has been controverted in a few instances by persons who were not able to conceive the distinctions I have drawn, still no adept has ever ventured to dispute the points I have advanced. I call your attention to the above scholia, and I will add here that truths by their own nature can be taken in a *limited* sense only. There is no such thing as a *universal* truth. There is no truth which can be applied indiscriminately or promiscuously—each thing having a *separate* existence from all other things—there can be a *peculiar* and *limited* agreement only between things. In the case of the circle and polygon, they are different things—one is bounded by a *curve* line, and the other by *straight* lines. Hence, the peculiar properties of the circle are dependent upon the na-

ture of the *curve* line—the same as the peculiar properties of the polygon are dependent upon the nature of the *straight* line. Thus, in all *rectilinear* measurement, the nature of the *straight* line is always brought into consideration. Hence, in *curvilinear* measurements, the nature of the *curve* line must be considered. The nature of the straight line is, that its length is always in *one* direction. Therefore, by means of two *parallel* straight lines, we can determine the area of any rectilinear figure—BENSON'S *Geometry*, Book 1, Prop. XXIII, Cor. 4. While the nature of the *curve* line is, that it is always changing the direction of its length, hence a circle is conceived as generated by the *revolution* of one extremity of a line around the other extremity as a centre, and the cone, sphere and cylinder are conceived as generated by the *revolutions* respectively of a right angled triangle, a semi-circle, and a rectangle, around an axis. The *revolution* constitutes the peculiarity of the curve line. Consequently, we derive the properties of curvilinear figures by revolution, the same as we derive the proportion between *cone, sphere* and *cylinder*, by the revolution of their respective sections. Although we obtain a different result from the *revolution* than we do from the *parallelism* of straight lines, still we have no absurdity, because the result in the former case is applicable to the circular magnitudes only; and that in the latter case is applicable to the rectilinear magnitudes only.

* * * * * *

LAWRENCE S. BENSON.

NEW YORK, March 5th, 1868.

### Argentiferous Galenas in Mexico.

MONCLOVA, COAHUILA, MEX., Feb. 12, 1868.

EDITOR AMERICAN JOURNAL OF MINING:

In No. 24, of 14th December, 1867, of the *American Journal of Mining*, I noticed an article on remarkable galena, by Mr. F. Shirmer. Does Mr. Shirmer comprise in the term *galena* any sulphuret of lead in mixture or combination, with other ores, such as jamesonit, linkenit, &c.? In the lodes of silver-bearing lead-ore of Santa Rosa, Coah., Mex., which occur in the blue limestone, and in some cases run out into the over-laying clay-slate, pertaining to the coal formation. I have met with lead ores assaying from one-tenth to 7:63 per cent. of silver; but, I must remark, that none of the richer ores were free from antimony. In the mine, "Gertrudes del bajo," native silver occurs in small grains up to one-half gramme of weight in lead-ore, something similar to the occurrence of free gold found in the crystals of pyrites in Winter's claim, Calaveras county, California, with the only difference, that the lead-ore is not crystalized. There is also a fine grained lead-ore, as fine as the grain of cast-steel, called by the Mexicans, *punta de aguja*—needle-point; this contains 4:16 per cent. of silver. The generally adopted rule about lead-ores, "the finer in grain, the more silver they contain," does not hold out in this district. The metals near to the surface, where they have been decomposed by the influence of water and air, are mostly carbonates of lead (seldom sulphates), some of which assay as high as 4:50 per cent. of silver. With the exception of zinc-blende, calamite, pyrites of iron, ochre of iron, and magnesia, no other metal is found on these lodes. The gangue rock is invariably limespar.

I would send you some specimens accompanying this, but will have to wait for a chance that may offer. In this country, where the dignified donkey is still the main representative of motive power, we are not blessed with express companies.

CH'S. SCHUCHARD, M. E.

### Mining on Lake Superior.

EDITOR AMERICAN JOURNAL OF MINING:

Having pointed out some of the evils under which as mining communities we labor—evils that arise at the other end of the line, I shall briefly refer to others which belong here. As a class I think our agents will compare favorably with those of mining districts in general knowledge, shrewdness, integrity and all other virtues which go to make up the men for such posts of honor and trust, yet it is a fact that very many of them do not manage a mine as they would if it belonged to themselves. Men whose honesty and ability no one questions, do many things that would not be done if their own money paid for it. Many thousands are annually expended on many of our large mines which might just as well be saved. I have known goods purchased at the very highest rates and dearest times that were not used for years afterward, when they could have been bought for 30 to 40 per ct. less. This may sometimes arise from the purchaser receiving a percentage on all goods sold him. The pernicious practice of allowing agents to thus deal, has cost this country hundreds of thousands of dollars. Men have made more, much more in this way than their salary, and done so I have no doubt with the knowledge—in some instances—of those who employed them. Brown has charge of a mine working five hundred men, and Muggins & Co. are in the wholesale grocery and provision trade. The latter say to the former, if you will patronize us we will sell you just as cheap as any one and allow you two per cent. on all you purchase. Brown buys $100,000 each year, the bills for which are rendered and receipted for that sum, $2,000 of which is pocketed by the agent. The practice quite common in our country, of allowing superintendents to sell goods on or near a mine, or hold an interest in mercantile houses that supply the mine, is also fraught with evils that should be avoided, and must be if mining companies would reduce all expenses to the standard of the greatest economy compatible with the interests of stockholders. There are so many ways in which those having charge of mines can economize, that it would be idle to offer ang suggestions or attempt a full list in a single article. Important contracts should, as a rule, be let to the lowest responsible bidder, instead, (as is too often the case,) of allowing some favorite to have the job at a higher figure than better men would have gladly taken for its fulfilment. Such contracts it is pretty well authenticated are sometimes let with the understanding that all profits above a certain sum are to be shared equally between the contractor and the agent. There is one other serious drawback to mining operations here, the remedy for which must commence at "the other end of the line," viz.: the neglect of agriculture. Grass is of spontaneous growth all over the W. P. of Michigan, yet hundreds of tons of hay are annually imported into Houghton, Keweenaw and Marquette counties, often at a ruinously high price, compared with what it could and should have been raised at home. Oats is a very certain and if rightly managed, profitable crop, yet many thousand bushels are annually brought to this country at a cost of 25 to 50 per cent. greater than it would cost to raise them here. Winter and Spring wheat have been successfully cultivated in Ontanagon County for many years—over 200 a cres of good wheat was grown last year, yet there is no mill in the county to grind it. There are 10,000 acres of open land in that county, yet there are not *ten* well cultivated farms. This policy must be changed ere our mining interests can prosper.

SPECTATOR.

* Our correspondent's first article on this subject was published on page 138 of the current volume.

### Titan Copying Press.

The accompanying illustration represents a very neat form of press for copying letters and manuscripts, generally known as a useful article in offices and counting rooms. The arms, with the screw, do not raise and lower like other presses, but remain always at the same height and may be used where other presses cannot. The screw is entirely concealed from view, thus preventing the operator from coming in contact with the oil or grease neccessary for lubricating the screw, and with other advantages, it makes a clean, neat and durable press for business purposes. The manufacturers who are the proprietors of the Excelsior Works, East 22d street, New

York, have named this the Titan Copying Press. The company have given especial attention to presses of this description, and make them in all styles. The Titan Copying Press weighs from fifty-five to sixty-five pounds. Some other presses made by the same parties are named the "Imperial," the "Premium," the "Cottage," and weigh from two hundred and twenty-five to fifty-eight pounds.

The Excelsior manufacturing company make a great variety of other useful articles, such as wrenches, hand-vices, tack-hammers, cast-steel-shears, scissors, ice-picks, &c.

During the past winter they have made a large number of handsome skates that have given great satisfaction to those who take pleasure in making evolutions and revolutions on ice.

### The Colorado Coal Fields.

*To the Denver Board of Trade:*

GENTLEMEN—Your Committee, to whom was referred the duty of collecting information respecting the location and extent of the coal measures of Colorado, beg leave to submit the following report. We do not propose to decide whether our coal measures belong to the tertiary or cretaceous formations, but are inclined to the opinion that they belong entirely to the cretaceous. We are also of the opinion, that although differing in quality in different localities, their formation dates from the same geological period. That the difference in quality arises partly from local extraneous matter, deposited with the beds when they were covered at the bottom of the cretaceous seas, and partly from different degrees of pressure, and partly, perhaps, from the different degrees of heat, to which they may have been subjected at the time of the upheaval of the mountains. That these "lodes" were deposited prior to the upheaval, there is no doubt, from their almost vertical position at the base of the mountains, and the evidence of disruption and displacement which appears in the developed beds on South Boulder, and as far east as the Islander bank on Coal Creek. The Austin bank, only four miles below, shows no evidence of displacement, and is unquestionably in the same series. Your Committee had not sufficient time to investigate this matter as its merits deserve, nor are the beds sufficiently developed at any point as yet, to ascertain the relative positions of the different veins, their number and quality, or the character and position of the contiguous rocks, as it will be done some day, so that when one member of the series is found, the relative position of all the others becomes known. We have been able to glean a few facts, sufficient, we think, to base the following theory upon, that the coal beds underlie the whole country, from the base of the mountains to the "Bijou Basin," then passing under the divide between the Platte and Arkansas, they re-appear in the valley of the Big Sandy. Whether at this point they again dip under the more recent formations, and extend indefinitely toward the valley of the Mississippi, or whether these outcrops are the eastern vein of the coal basin, your committee can only submit an opinion unsubstantiated by facts personally known to them. We are inclined to the latter theory. We speak of the Bijou and Big Sandy as being the eastern limit of the coal fields; we mean that at about that distance from the mountains, (from 75 to 100 miles,) the eastern rim of the coal basin will be found. That these same beds extend north and south along the easterly base of the mountains, for several hundred miles, there is very little doubt. From the "bad lands" to New Mexico, that the veins of coal in this basin may be wanting entirely in some localities and be too "brown" or have too much argillaceous matter in them for use, and in still other localities be too thin to be successfully worked, is more than possible. It is propable. Yet we believe that the developments and discoveries of the next five years, will prove these beds to be practically inexhaustible. We would like to submit an analysis of this coal, but have none at our hand. From analyses which have been made, and from our own experience, we are satisfied that the coal from our best developed lodes, except for smelting purposes, has no superior in the beds of the older States. The best lodes, as now developed, are on the South Boulder and Coal Creeks. Whether the coal in other localities will be of as good a quality, future development will determine. We believe that as good coal will be found the entire distance between the Boulder and the Arkansas. North of the Cache a la Poudre, an inferior quality of coal is being mined in one or two localities. Yet even in these localities we are inclined to the opinion that veins will yet be found that will equal in quality the Boulder and Coal Creek coals. Coal is said to have been found in the South Park. It is found in the Middle Park, and appears in abundance upon White River, far on the Western slope of the mountains. These beds were doubtless formed at the same geological period, at the bottom of the same cretaceous sea, with our beds on the eastern slope, and afterwards settled by the upheaval of the mountains. No outcrop of the "coal" proper, of geology has been found in Colorado. It may possibly be found on the upturned stratified rocks at the base of the mountains, but it is hardly probable. It belongs in the metamorphosed rocks of the lower mountains, and the heat which charged the rocks of the series would doubtless consume the coal. Gentlemen, we are aware that this report is meagre and unsatisfactory. Our excuse is want of time to investigate, and facilities for investigation. We ask for further time to pursue our "carboniferous" inquiries, and if it be granted us, we hope to give you, at some future time, a report more intelligent, detailed and satisfactory. Respectfully submitted.

E. M. CASE, Chairman.

## Manufacturing and Mechanical Notes.

No. X.

### Architectural Ornaments.

PASTE COMPO, or putty, is employed now to only a very limited extent, but formerly it was generally used in making ornaments for picture frames, or in imitation of expensive carved wood, and for the decoration of panels in old wainscotting or coffered ceilings, as well as for the decoration of ships' cabins. The putty, or paste, is made in various ways; sometimes nothing is used but whiting and glue, at other times, and for uses where moisture would affect it, the glue is made with linseed oil instead of water, and rosin in powder is added; but for all practicable purposes putty, such as glaziers use, may be employed, if the oil used contain driers. In making up the putty to imitate any particular kind of wood, lumps of it are made up with colors, each color corresponding to one of those noticed in the graining of the wood; and the graining is then imitated by using strips of paste of different colors and of different thicknesses, and pressing them into moulds of sulphur, plaster, or metal, with a screw, togglejoint, or hydraulic press. The ornaments are glued and nailed on, and are finished with varnishing or gilding. For outside work, terra cotta is somewhat in vogue; but iron, zinc, &c., have proved so much more durable and cheap, that they are used when the natural stone is not to be employed. Terra Cotta is nothing but burned clay. The ornament is moulded by pressure, like putty ornaments, and is afterwards cleaned up and finished up by hand; it is then air-dried, and subsequently burned. There are several terra cotta factories in this country; and vases, capitals, window and door heads, consols, brackets and whole cornices are made of it. Several houses in New York are decorated with this material. In making ornaments of Roman cement, the "set" of the cement is seldom relied upon, and plaster is, therefore, mixed with it, when the ornaments become practically worthless. There is no reason why hydraulic cement, or mortars, may not be used with advantage for this purpose, but workmen, in general, know nothing of the chemistry or philosophy of their business, and the result is that they do not work this class of materials judiciously for any purpose. When ornaments are made of stone dust, of sand, the cementing is effected by means of shellac varnish, and the ornament is shaped in a plaster mould—the mould being moistened to hinder the cast sticking in. These ornaments are very rarely used, except to piece out the real stone when it has got broken, and then the patch has a different shade of color from the original stone. There is no reason why bleached shellac and powdered marble should not be used to make beautiful statuettes; though paraffine might be employed where the statuette is not likely to get too much heat.

Of all the materials used for external decoration, there is none so extensively used in this country, after the original stone, as iron. The most delicate ornaments of ancient art, and the most fanciful of modern invention, are alike produced now in iron. Cornices, in sections, with all their decorations; columns, capitals, entablatures, and all the details of architecture, and even whole buildings are produced in iron. The art of founding is too well known to need our description; but the method of fastening the minor ornaments upon any large work may not be so well understood. It is effected either by rivets or by a dovetail on the back of the piece catching into a groove in the core, thereby tightening and securing the piece. When iron ornaments are well painted and sanded, they have all the appearance of sandstone, but they never can well imitate marble. Zinc, lead, and even copper, have been used occasionally for making ornaments, but their great expense prevents their general, or even their extensive adoption. In all cases, where small ornaments are to be produced, in numbers of the same kind, the best sort of mould is iron; and the method of casting iron in iron moulds is adopted with great success, to produce beautiful wire fencing for verandahs, areas, &c.

## Patent Claims.

### Interesting to Miners, Millmen, Metallurgists, Oil-Men, and Others.

75,078.—FURNACE FOR DECARBONIZING PIG-IRON FOR THE PRODUCTION OF STEEL.—Alois Thoma, New York, N. Y., assignor to himself, S. Bromberg, and A. W. Wilder, same place.

I claim, 1. The arrangement of the partitions *i i* in the channels, *a*, for more thoroughly heating and burning the gases on their passage to the decarbonizing chamber, as set forth.

2. The perforated walls D D, arranged between the ends of the channels, *a*, and the chamber, B, to allow the gases to gather in the chambers, K, thus created, and to be cooled therein, as set forth.

3. Conducting the gases from the chamber, B, to a chamber, G, through which the pipes, H, are laid, in which air is conducted to the channels, *a*, to aid the combustion of the gases in said channels, so that, by means of the gas discharged from the furnace, the air entering the same is heated, as set forth.

4. The channels *a*, partitions, *i*, air chambers, H, perforated walls, D, decarbonizing chamber, B, channels, *o* and *p*, chamber, G, and pipes, H, all arranged as described, in combination with each other, and all operating substantially as and for the purpose herein shown and described.

75,165.—HYDROCARBON BURNER.—John S. Hull, Cincinnati, Ohio.

I claim, 1. A heater or burner apparatus, supplied at all points of combustion by the force of compressed air acting upon the fluid, substantially as and for the purpose herein specified.

2. A cut-off valve, C, between the pump, B, and the reservoir, for the purpose set forth.

3. The location of the air and fluid-ducts *a* and *b* outside of the reservoir, substantially as and for the purpose specified.

4. The double-bosses, *f*, for attaching the pipe-coupling to the reservoir, for the purpose set forth.

5. The arrangement of the burners, G G, in numbers upon different tubes, F4 F4, which are separately or in sets, provided with cut-off valves, so as to increase or diminish or distribute the burners to any desired extent, substantially as herein set forth.

6. The superheating tubes, F2 F2, extended over the burners and communicating with the pipes, J J, substantially as and for the purpose herein set forth.

7. The arrangement of flame-detectors, I I, over the superheating tubes, substantially as specified.

8. The arrangement of numbers of burners, G G, in line with one another, so that the burners, *l l l*, of each set may be connected with one adjusting shaft, and adjusted simultaneously, substantially as specified.

9. The adjustment of the said burner-points separately to their connections with the common adjusting shaft, for the purpose set forth.

10. The introduction of the superheated steam-jets into the flame-jets of the burners directed thereto, substantially as and for the purpose herein specified.

11. The employment of steam for clearing out the supply and burner-tubes, which are so arranged as to admit the passage of the steam through them, substantially as herein described.

# Special Scientific Brevities.

☞ A new method of making the curious chemical toys called "Pharaoh's Serpents" has been suggested by Vorbinger. The black liquor which results as a useless product when coal oil is purified with sulphuric acid, is to be treated with fuming nitric acid. The dark-colored, resinous matter which swims on the surface is then collected, washed and dried, when it forms a yellowish-brown mass having about the consistency of sulphur which has been melted and poured into water. When this mass is ignited it undergoes such a wonderful increase in bulk that a cylinder one inch long will give a snake about four feet in length. The briefness of the popularity enjoyed by the "original" serpents was due to the unhealthy vapors given off in the process of burning.

☞ The inhabitants of Lee County, Va., were lately quite excited at the simultaneous appearance of three rising suns, which some of the more ignorant regarded as an omen of coming evil. The true sun was surrounded by a beautiful-colored halo; above this was another partially-developed halo, beneath which two mock suns were visible for a short time. The phenomena of colored halos are due to the refraction of light by frozen particles floating in the atmosphere at a great height, while the white or uncolored parhelic circles arise from reflections. They are never seen unless the *cirrus* or *cirro-stratus* cloud intervenes between the sun and the observer.

☞ Mr. J. E. Hoyer, of Philadelphia, has invented a new kind of writing and printing paper. The improvement consists in charging the paper with an earthy carbonate. Common writing ink, of the palest description, when applied to it, becomes intensely black. The mineral surface given to the paper prevents "greasiness," and allows the ink to flow freely. It also takes printing ink more readily, and produces a black and smooth impression.

☞ Dr. B. W. Richardson has made some experiments with light-carburetted hydrogen, known among miners as fire-damp, to ascertain what percentage in air would be fatal to the animal breathing it. He found that pigeons could live about half an hour in air containing 35 per cent. of that gas. The diminution of circulation and respiration was so gradual that it was difficult to determine the exact time when death ensued.

☞ The resistless power of frozen water is illustrated in a lecture on heat and cold, delivered by Professor Tyndall, before the Royal Institution of Great Britain. Among his experiments, an ordinary bombshell was filled with water, securely plugged, and then placed in a bucket filled with pounded ice and salt, to freeze it. In about half an hour the bombshell was burst into fragments by freezing of the combined water.

☞ Mr. Alvergniat, of Paris, has constructed a new apparatus for proving that electricity cannot pass through an absolute vacuum. Two platinium wires are inserted into a tube so that their free ends are within about an eighth of an inch of each other. The air is then exhausted from the tube by means of a mercurial column, after which the electric spark will not pass from one platinium wire to the other.

# On-dit about Minerals, &c.

☞ An English patent has lately been granted for an improved metal, from which it is claimed castings may be procured or steel manufactured in much less time and at a greatly reduced rate, than by other processes. After the ore is reduced in the blast furnace to the state of molten crude metal, the furnace is tapped, and the liquid metal runs off into a vessel or receptacle, when a blast of atmospheric air of a pressure of four pounds to the square inch, and upwards, is introduced into the mass through a hollow stirring rod. The effect is the driving off of the impurities, and the metal may run directly into molds, or steel of a fine quality may be procured by adding unmelted spiegeliesen or other compound of iron and carbon.

☞ Among articles imported by the United States in 1857, from Mexico, were $100,000 worth of mahogany and dye-woods; $518,900 worth of raw skins; $12,359 of unmanufactured tobacco; $15,319 of salt; $86,745 of cochineal; and about $5,000,000 of silver, the latter free of duty. On the other hand the United States exported to Mexico $174,873 worth of Indian corn; $170,038 of flour; $70,000 of lumber and wooden manufacture; $366,000 of iron manufactures; about $220,000 of printed cotton and duck; $510,000 of quicksilver; and $999,747 of cotton in bales.

☞ The treasure seeking mania has broken out again in California. A "Cocos Island guano and Piroot treasure expedition" has been organized, and parties are endeavoring to get up an expedition to raise a frigate laden with gold and silver ingots, doubloons, &c., sunk on the Peruvian coast, nine hundred years ago! A remarkable circumstance connected with this frigate is, that it is sunk in only fifteen feet of water.

☞ The only rolling mill in Wisconsin, is that of the Milwaukee Iron Company, at Milwaukee. It was projected about one year ago, and is now nearly ready for work. The main building is 211 by 180 feet, and is without supporting inside pillars. It contains seven combined furnaces. The engine which drives the machinery is of 1,000 horse power, the fly-wheel of which weighs 30 tons and is 32 feet in diameter.

☞ A tract of land has been purchased in North Stonington, Mass., by parties who claim to have discovered a deposit of asbestos upon it, which is very valuable. It is of the species known as the "amianthus," which is used in making gloves and other articles for the use of chemists, etc. It resists the action of fire and acids to a greater degree than any other mineral known, and on this account especially does it possess its value.

☞ The *Frontier Index* states that incredible deposits of gold and silver have just been discovered within fifteen miles of Sonders, in Wyoming Territory. An exploring party has brought in several specimens of gold, silver and copper quartz, which were thoroughly tested and proved to be as rich as any discoveries ever made, either in Montana or California.

☞ It appears from the gold-mining records of the colony of Victoria, that twelve selected mines, with an aggregate paid-up capital of $726,910, have paid us profits in the short period of from seven months to five years, no less a sum than $9,394,535.

☞ During the month of February, the sum of $376,288 was coined at the mint in Philadelphia, including $169,621 in gold, $50,966 in silver, $8,990 in one cent pieces, $4,950 in two cent pieces and $129,400 in five cent pieces.

☞ The first salt mines were opened in this country in 1797, and since then eighty million pounds of salt have been taken out. These mines are at Syracuse, N. Y., and are said to produce the best salt in the world.

☞ A patent case has recently been decided by the District Supreme Court, awarding the exclusive right of making wells by driving a pipe or rod into the ground, to Col. N. W. Green, of Portageville, N. Y.

☞ Among other new uses of steel, one of the latest is that of the employment of this metal for billiard balls instead of ivory. They are very elastic, and are not liable to crack like those in present use.

☞ The Pennsylvania Steel Works, at Baldwin, Pa., which employ one hundred hands, are now turning out fifteen tons of Bessemer steel per day.

☞ Three new furnaces are to be built in Danville, Pa., by the Pennsylvania Iron Company, Grove Brothers and the National Iron Company.

☞ A bill to locate and establish an Assay office at Boise City, Idaho, has passed Congress.

# All Sorts.

☞ Prominent builders of New York are beginning to see that in substituting iron for wood, in the erection and completion of buildings they have not only an entirely durable structure, but one which is secure against loss by fire. It is estimated that had iron been generally employed instead of wood in finishing the interior of buildings in New York alone, during the last thirty years, the absolute saving to the wealth of that city, would have amounted to hundreds of millions of dollars. Architects have become satisfied that not only are iron structures entirely safe, but that the material is adapted to an infinite variety of graceful and pleasing designs, and have accordingly directed their attention to the development of its capabilities. The interior work of the new dwelling house of A. T. Stewart, on Fifth avenue, and that also for the extension of his Broadway and Fifth street store, will all be finished in iron.

☞ A somewhat singular fact is illustrated by the recent announcement, almost simultaneously in America and England, of a new, and, as it will undoubtedly prove, useful invention, viz.: that of applying electricity to the discovery—(not extraction, as some of the journals have it)—of bullets imbedded in the human flesh. In the American invention—the only one we have thoroughly examined—there is a metallic combination in the nipper probe, which, by an electrical current, reveals the presence of the ball the instant it is reached. The same invention is claimed by Dr. Wilde, of London, and the apparatus, as it has been described to us, is nearly the same. From several parts of the continent, also, we hear of claimants to this invention.

☞ The London *Post Magazine* thus estimates and compares the cost of extinguishing Fires in the United States and in London: In Baltimore they spend $450 00 on each fire; in Boston they spend upwards of $875 40; in Brooklyn upwards of $175 00; in Buffalo upwards of $425 00; in Montreal upwards of $166 00; in New Orleans upwards of $860 00; in Philadelphia upwards of $240 00; in San Francisco upwards of $590 00; in St. Louis upwards of $625 00; in Troy upwards of $315 00; whereas in London, for many years, $90 00 have been the average; $69 00 in Liverpool, and $100 00 in Dublin.

☞ Here is the latest idea as to heating and ventilating railroad cars: Cars are to be constructed with double floors, with a space of six or eight inches between them, in which are to be placed lead pipes for conducting steam and radiating heat. These are to be connected with a boiler in a separate car, in the rear, by elastic couplings. This car is to be built of stout timber and lined with boiler iron, and be large enough to contain the boiler, fuel and engineer. The sides of the car between the floors are to be furnished with registers for warming the cars; and near the roof are to be ventilators to let off the impure, heated air.

☞ The losses by fire in the United States during February, 1868, caused by conflagrations, the loss at each of which was over $20,000, amounted in the aggregate to $4,329,000. During January, the losses by fire were 85,449,000, and during December, $4,274,000, a total for the three winter months of $14,052,000, as compared with $15,083,000 for the winter of 1866-7 a decrease of $1,031,000.

☞ Avaricious California, who already has about all the mineral, cereal and herbal gifts known to man, hankers after tea, and is importing tea-seed from Japan to start her tea-fields. There seems to be no reason why the experiment should not succeed, as the tea-plant is hardy. It has been introduced in Northern India, which now exports 7,060,000 pounds annually.

☞ Some idea may be formed of the extent to which the property of Great Britain is concentrated within few hands from the fact, shown by official records, that only about seven thousand persons return incomes, amounting in the aggregate to more than $500,000,000. This number represents the nobility, gentry, etc., of the United Kingdom.

☞ The manufactured products of St. Louis in 1867, amounted to $41,625,247, and the total number of hands employed in manufactures, was 9,532; 35 mills, with 413 hands, turned out $6,183,162 worth of flour. Four stove factories, with 700 hands, turned out 97,374 stoves, valued at $1,460,610.

☞ The great Kelley lead mine in Dubuque county, Iowa, now worth several millions, was originally divided into two portions or shares, one half of which was sold to the Catholic church of the town of that name for one dollar.

☞ St. Louis occupies an area of sixteen square miles, or 10,240 acres.

☞ Utah has seventeen thousand children in its public schools.

# Special Notices.

The following letter explains itself, and is but one of a number of a similar kind in the hands of the company, addressed: "STEINWAY & SONS, Manufacturers of Grand, Square and Upright Piano Fortes. Warerooms, Steinway Hall, Nos. 109 and 111, East Fourteenth street.

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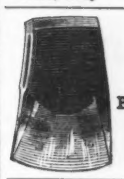

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CHARLES SCHENK, a resident of Pah-Ranagat Silver Mining District, and County Surveyor of Lincoln county, Nevada, begs leave to inform the mining public, that he is able and ready to give true and valuable information about mining property in this District.
Address CHARLES SCHENK, M. E.,
Hiko, Pahranagat District, Nevada.
References—Wm. A. Smith, Esq., 25 and 27 Nassau street.
Prof. Harper, New York, etc. oct12, '67:'68

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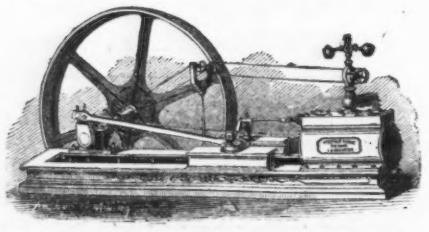

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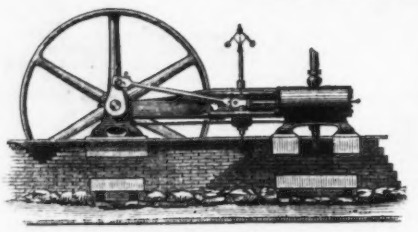

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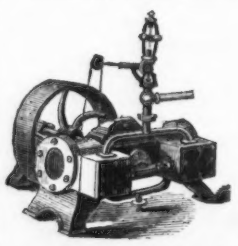

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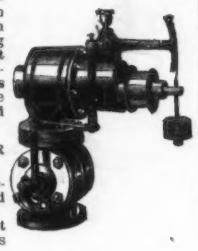

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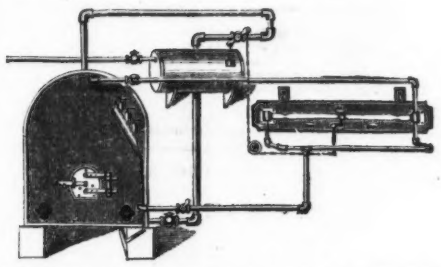

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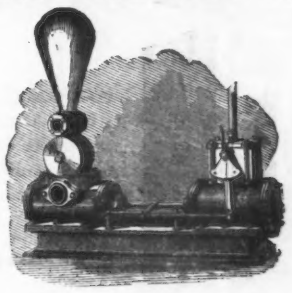

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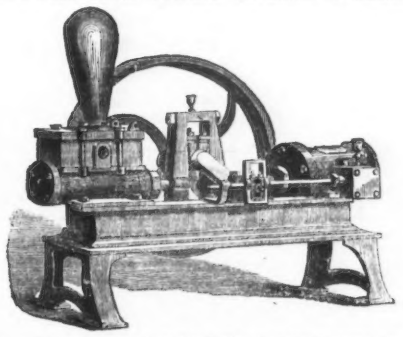

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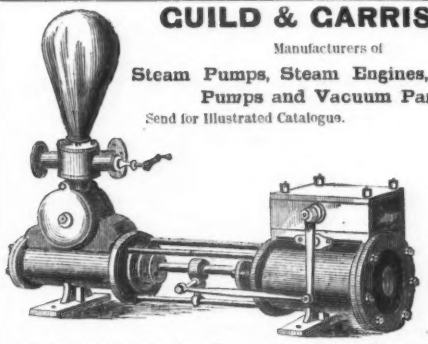

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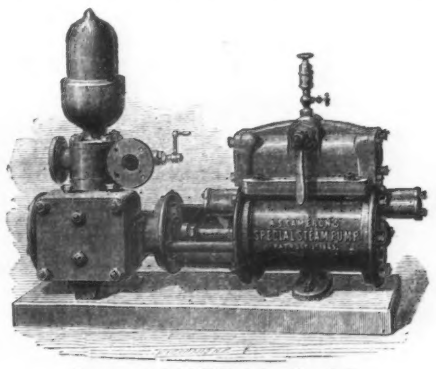


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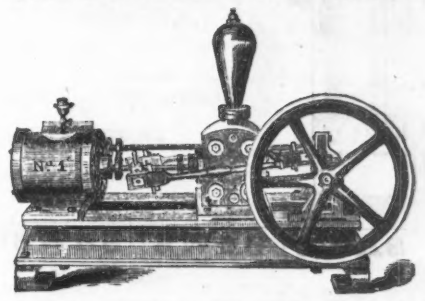

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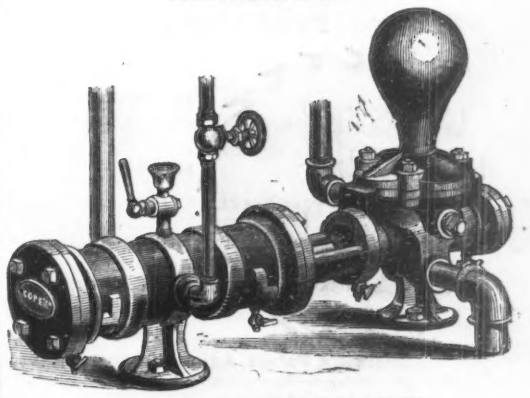

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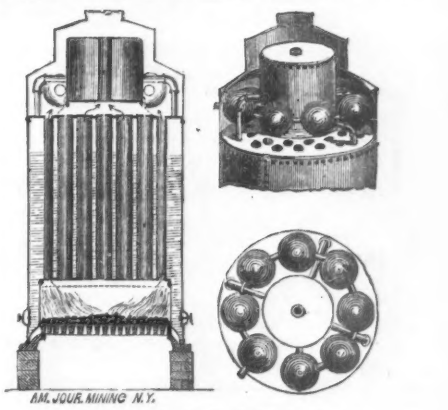


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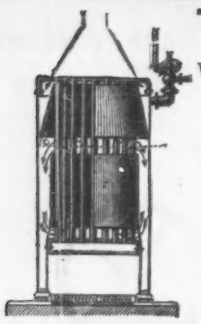

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11:3:1qp

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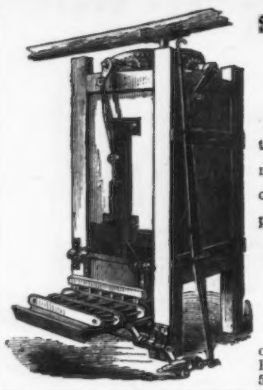

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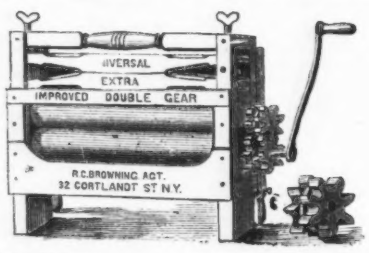


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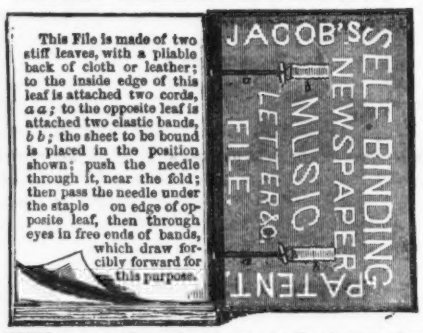
This File is made of two stiff leaves, with a pliable back of cloth or leather; to the inside edge of this leaf is attached two cords, a a; to the opposite leaf is attached two elastic bands, b b; the sheet to be bound is placed in the position shown; push the needle through it, near the fold; then pass the needle under the staple on edge of opposite leaf, then through eyes in free ends of bands, which draw forcibly forward for this purpose.
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## PUBLICATIONS.

### PROSPECTUS.

# EL CORREO HISPANO-AMERICANO;

**A Journal of Commerce, Agriculture, Mining, Mechanics, Railway Enterprise, &c., especially devoted to the interests of the Spanish American States, issued the 1st, 10th and 20th of Every Month.**

The much-to-be-regretted absence of adequate commercial intercourse between the Northern and Southern continents of America is mainly to be attributed to two causes. The first of these is the lack of proper information, among the industrial and agricultural classes of the Spanish American Republics, concerning the facilities and advantages offered by the manufactures of the United States; and the second is the entire absence of direct communication between the producers of this, and the consumers of those nations; while those who are really aware of the favorable opportunities here offered are deterred from availing themselves of such advantages by the fact that the expense of importations is not infrequently tripled or quadrupled by the passage of merchandise through three or four hands before reaching its final destination. England and France have commanded hitherto the markets of South America for all kinds of manufactures, while the United States, excelling in almost every department, and offering in addition the inducement of low prices, have enjoyed but a small share of the trade. Few manufacturers in this country are aware of the vast extent and profitable nature of this commerce; but the conviction of this fact is rapidly making itself felt; and there is urgent inquiry for the proper means turning this tide, which now flows to Europe, towards the shores of Northern Continent. The possible acquisition by the United States, at remote day, of an important foothold among the Spanish American islands gives the subject at the present time great additional importance. Our naval supremacy in those regions should be accompanied by the commercial supremacy which it is chiefly useful to defend.

The best and surest means to this end is to furnish the Spanish American consumer with full and accurate information regarding the commerce, manufactures, mechanical arts, mining, metallurgy, railways, &c., of this country, setting forth in these departments our superiority to the nations of the Old World, and explaining the advantages offered in our markets.

Our conviction of the usefulness of such a step, based upon long and careful examination of the subject, and thorough personal acquaintance with each one of the Republics in question, their resources, interests and requirements, has received, of late, additional confirmation from communications addressed to us, as Publishers of the AMERICAN JOURNAL OF MINING, by prominent and influential citizens of Mexico and the other Hispano-American Republics, pointing out the expediency of either translating our Journal into Spanish, or publishing a periodical in that language for circulation in those countries. These gentlemen have urged us to put the plan into immediate execution, and promised us their influence and personal support.

We have therefore resolved upon the issue of "EL CORREO HISPANO-AMERICANO," for the purposes set forth above; and we feel assured that the nature of the Journal itself, together with the facilities we possess for its publication, and the patronage already spontaneously offered and secured, will render it not only the best medium of publicity for the manufactures of the United States, but one which cannot be superseded in point of universal circulation, efficiency of advertising, and economy of terms.

It will at once be evident, that the "CORREO HISPANO-AMERICANO" will not, like newspapers in general, depend upon partisan or political beliefs for its popularity. Politics having no place in its columns, it will have no rivals, will be free from all shackles of party spirit or interest, and will be welcomed in all circles and by all classes as a real friend, the bearer of useful information on matters of vital interest to all. Hence, it cannot com into competition with political journals of the day.

Besides the matters of value to the Spanish American reader already enumerated, the CORREO will contain the most complete market reports, including the prices of all crude and manufactured materials in the production, exchange, or consumption of which its subscribers are interested. As the day of publication coincides with the sailing of the Pacific Mail Steamer, these reports, corrected to the last moment before going to press, will afford the very latest information which can be obtained, surpassing, in this respect, all other periodical bulletins of prices current.

We would respectfully submit the following facts for the consideration of

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We feel confident that this tariff will meet the approbation of all concerned; and to those who have already advertised in the columns of South American papers, the difference offered in their favor by the "CORREO" will at once be apparent, especially when they reflect that, in order to secure an adequate advertisement, covering the ground offered by our new Journal, the "CORREO HISPANO-AMERICANO," they must have recourse to the columns of all the principal newspapers in all the chief cities of each Island and Republic. Now, there are no less than *forty-seven* such newspapers, charging at an average rate 5¼ cents in gold (equal to say 7¼ cents in currency, at the present price of gold) per line for each insertion: that is to say, an advertisement of 10 lines costs for a *single time* $26.00 (gold), or $36,40 (in currency). The same advertisement in the "CORREO HISPANO-AMERICANO" costs but $2.50 in currency, and gives, besides, a superior medium of publicity, and also an incomparably wider circulation than can be reached through the above papers; for the "CORREO" will circulate where those, for political reasons, if for no others, can never go, namely, Spain. There too our Journal will be received as the welcome harbinger of useful and profitable information for all classes of society, and chiefly for the mercantile, agricultural and industrial communities.

Need we mention the benefit advertisers will derive also from the considerable circulation the "CORREO" will have in the United States? This we deem superfluous, and so, shall add no more to the incontestable advantages already enumerated.

We hope our friends and the industrial community generally will make all possible dispatch in handing in their advertisements, for the time is now short for translation, &c., before the publication of the first number, January 10th, 1868.

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Miscellaneous Articles, culled from a selection of the leading scientific publications of Europe and America.

Reviews of New Publications on Science, Statistics, and other subjects immediately connected with the objects of the paper.

Reports of the Proceedings of the Polytechnic Branch of the American Institute, and other Scientific bodies.

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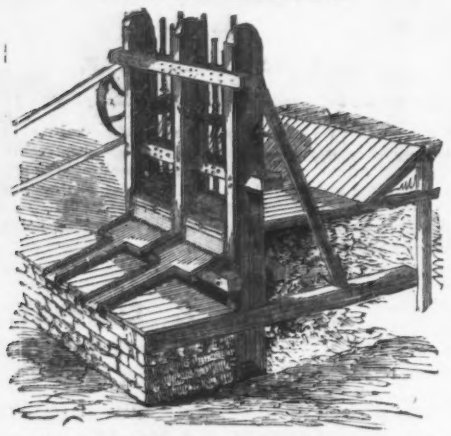

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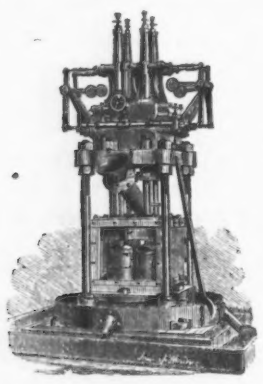

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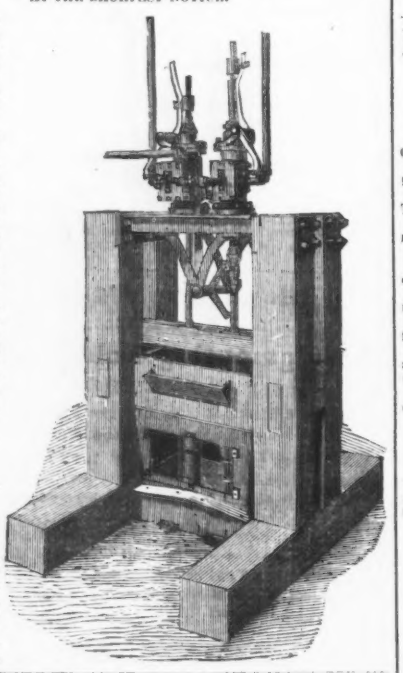

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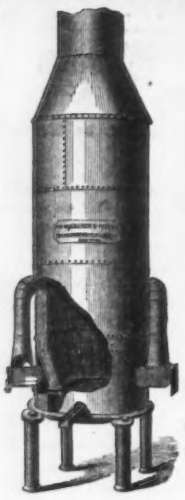

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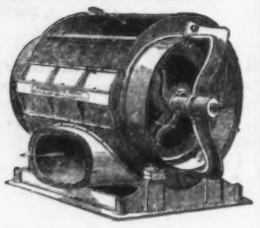

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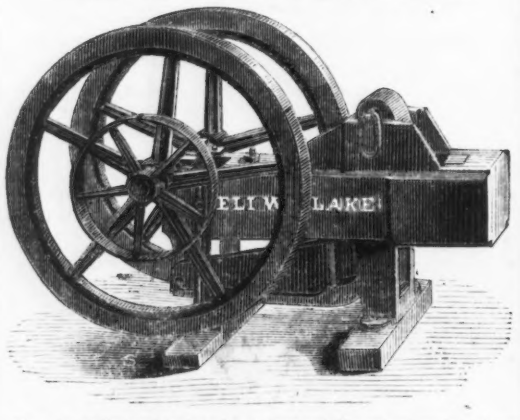


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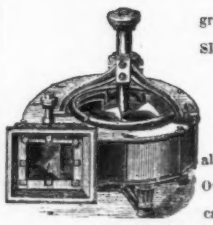

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